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ABSTRACT

This guide is designed to help elementary and secondary school teachers and curriculum developers plan units on the future. It is presented in five sections. Section I discusses the origins of the modern futures movement and the concepts of future studies, time dimensions, global approach, self-fulfilling and self-defeating forecasts, and types of futures orientations. Section II examines human futures in terms of values, knowledge, technology, and social issues. Section III presents methods of forecasting the future: genius forecasting, characterized by the creativity, analysis, and intuitiveness of novelists and scientists; trend extrapolation, the extension of present and historical patterns into the future; consensus of experts on a particular issue; simulation; cross-impact matrix analyses which chart possible future events and their influence on other events; scenarios, decision trees, and pictorial representations of the potential results of alternative approaches to crucial decisions; and systems analysis for use in public policy decisions. Section IV provides suggestions for curriculum planning, including topics in communication, energy, family life, food, health, values, transportation, work, international affairs, and education. Examples of unit formats are also provided. The document concludes with annotated bibliographies of general readings for the teacher and curriculum developer, specific futures topics, and future studies curricula. (KC)

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Future Studies in the K-12 Curriculum

by

John D. Haas

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PREFACE

One of the dilemmas faced by teachers and curriculum developers in such broad fields as language arts, science, and social studies is how to incorporate into these already crowded curricula new timely topics and crucial current social issues. Probably the dilemma will always be present, since the curriculum is constantly in a state of dynamic equilibrium between the forces of continuity and change. Perhaps all curricular subjects should include both traditional topics and current topics, the old and the new, the esoteric and the relevant.

In advocating a place for future studies in the curriculum, I do not have in mind any magic model or special slot. A modest beginning is all that one can expect: a few lessons, a short unit, a course here and there; an interested and enterprising teacher or coordinator in this school or that district. Monumental changes may not be possible in American public education, but infiltration strategies by individuals and small groups can be successful. This is how the futures movement achieved its beginnings, and also how future studies emerged in schools and colleges. Perhaps grand designs should be suspect.

Many claims can be and have been made for the inclusion of future studies in the curriculum. Five are particularly persuasive for me:

1. Because children and youth have the greatest portion of the future available to them.

2. Because the time continuum is incomplete without the future to extend the past and present.

3. Because citizens need to be participants in decisions that affect their collective future.

4. Because individuals need to envision their personal goals as motivational spurs to action and achievement.

5. Because we all need to perceive the generations of our species not yet born in order to be stewards for them.

This monograph was written for teachers and curriculum developers who have some interest in planning units and courses on the future. Since the study of the future is multi-disciplinary in nature, the units and courses might be in any subject, but are probably most appropriate in language arts, science, or social studies. The reader should know, however, that this author's background is mainly in social studies. Further, the reader should be aware that this is neither a step-by-step curriculum primer nor a collection of responses to the question, "What do I do Monday?"

The volume was written to accomplish two goals: (1) to provide a brief introduction to the field of futurology (especially human social futures), which occupies almost three-fourths of the booklet; and (2) to offer some suggestions for teaching future studies in elementary and secondary schools, including potential topics and course and unit formats. The monograph ends with three bibliographies that should be useful to readers who wish to pursue various topics in more depth.

A final caveat! Though I am not a professional futurist, I do have a preference for the Transformationalist point of view as contrasted with that of the Extrapolationist, which is to say I tend to agree with those futurists who see the need to abandon (or at least to modify) those values and assumptions of Western industrialized nations that have brought these societies to the brink of disaster and that threaten the future existence of our species. I am gravely alarmed, yet hopeful for the needed transformations in culture and consciousness. This is not the dominant view among futurists.

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Now there is one outstanding important fact regarding Spaceship Earth, and that is that no instruction book came with it.... Thus, because the instruction manual was missing we are learning how we safely can anticipate the consequence of an increasing number of alternative ways of extending our satisfactory survival and growth--both physical and metaphysical.

--Fuller, R. B. *Operating manual for spaceship earth.* New York: Pocket Books, 1970, pp. 47-48.

Time, said St. Augustine, is a three-fold present: the present as we experience it, the past as a present memory, and the future as a present expectation.

--Bell, D. The year 2000--the trajectory of an idea. *Daedalus,* Summer 1967, 96(3), 639.

Accommodating our needs and numbers to the earth's natural capacities and resources will affect virtually every facet of human existence. In terms of its effects on human values and institutions, the coming transformation could ultimately approach the Agricultural and Industrial Revolutions.

--Brown, L. R. *The twenty-ninth day.* New York: W. W. Norton, 1978, p. 272.

At rare intervals, the most significant factors in determining the future occur in infinitesimal quantities on unique occasions.

--Mumford, L. *The transformations of man.* New York: Harper, 1956, p. 181.

FUTURE STUDIES IN THE K-12 CURRICULUM

John D. Haas

Introduction

We are all time travelers, able to journey at will through past and future landscapes, and all this by virtue of a most remarkable time machine within each of our heads. Time-bound in one sense, in another we're able to create time-warps--which speed us in an instant to strange or familiar habitats, past or future, within or outside the universe. In our genes, in our collective unconscious, in our experiences, each of us is a universe, a time-space of unique dimensions.

The future is one of our natural abodes. Not only can we dwell there, we can create what is there. As in all of our many existences, in our futures we are both creatures and creators. To know our futures as much as to know our pasts is to know ourselves. In the invisible interval, at that point-in-motion, we exist. And it is the quality of our existence that concerns us most as we probe our possible futures.

Human beings have never been strangers to the future. A few million years ago our ancestors already comprehended Nature's cycles: day and night, life and death, and the tell-tale signs of the seasons--occurrence and recurrence. Ancient oracles, prophets, and seers were futurists, as were astronomers and naturalists. But more important, all humans are futurists because we care--about ourselves, our children, our friends, our species. Because we care, we choose--to reproduce, to nurture, to protect, to secure, to create, or even not to choose and to submit to the fates. To live and to value life is our supreme commitment to the future.

Origins of Modern Futures Movement

For almost the entire span of existence of homo sapiens, change in the conditions of our survival has been relatively slow.

> The fewer changes we anticipate, the more we can continue to rely on our knowledge for the future. ...On the other hand, the future validity of our knowledge becomes increasingly doubtful as the mood of society inclines toward change and the changes promise to be more rapid.[1]

It was in such a time of social turmoil, the mid-1960s, that the modern professional futures movement catapulted into prominence on the global scene. Its contemporary origins, however, can be traced to the era of World War II. At that time the military became concerned about the prospects of new weapons, and the term they used to describe future developments in weaponry was "technological forecasting." After the war,

> scientists and the military, impressed by the way in which such radically new scientific and technological break-throughs as radar, the atomic bomb, and intercontinental ballistic missiles had transformed warfare, began to search on a regular basis for ways in which the nature of the next war could be predicted and planned for in advance.[2]

The now-famous Rand Corporation had its beginnings as a military "futures shop" in the 1940s. Most of the other futures organizations in the United States, however, were founded between 1959 and 1976. For example, the Cambridge Research Institute, Inc. (Cambridge, MA) was founded in 1959; Society for the Investigation of Recurring Events (Linden, NJ) in 1960; the Hudson Institute (Croton-on-Hudson, NY) in 1961; the World Future Society (Washington, DC) in 1966; Stanford Research Institute's Center for the Study of Social Policy (Menlo Park, CA) and Educational Policy Research Center (Syracuse, NY) in 1967; the Institute for the Future (Menlo Park, CA) in 1968; Futuremics, Inc. (Washington, DC) and The Futures Group, Inc. (Glastonbury, CT) in 1971; the Office of Technology Assessment of the U.S. Congress (Washington, DC) in 1973; the Worldwatch Institute (Washington, DC) in 1974; the Congressional Clearinghouse on the Future (Washington, DC) in 1976.[3]

Worldwide, several hundred corporations, institutes, associations, and public agencies are dedicated to the study of the future. With a few exceptions, these have come into existence during the 1960s and 1970s. Virtually all of the futures groups in the world setting are located in the U.S., U.S.S.R., Western Europe, Communist Eastern Europe, Canada, and Japan.[4]

Although probably ten or twenty published works might be considered seminal to the contemporary futures movement, three would probably be on everyone's list: The Art of Conjecture, by Bertrand de Jouvenel; "Toward the Year 2000," Special Issue of Daedalus, by S.R. Graubard (Editor); and The Year 2000, by Herman Kahn and A.J. Wiener. Significantly, all three publications appeared in the same year--1967.[5]

Some Key Futures Concepts

The futures field. The names applied to the field that encompasses the study of the future have created some confusion. Probably the four most recognized terms in this field are "future studies," "futurology," "futurism," and "futuristics." When the focus is on social policy decisions, the term used is "policy research"; the term "technology assessment" applies to concerns about new technological inventions, products, or processes. There is general agreement, however, that practitioners of the art/science of studying the future are "futurists."

The term "future studies" is often used when referring to the study of the future as a part of school curricula, usually in the broad curricular fields of English, science, or social studies, or in multi-disciplinary courses.

A related source of some debate has to do with what term is appropriate for describing the outcomes of futures research. Usually, futurists avoid using words like "prediction" and "prophecy." "Prediction" implies a control of phenomena and a precision in measurement more suited to the physical sciences and their use of experimental methods than to futurology and its phenomena and conditions. On the other hand, futurists also are reluctant to use the word "prophecy" because of its traditional connection with religious prophets or fortune-telling charlatans. The preferred term is "forecast" (and "forecasting") because this term suggests the probability of future events or phenomena as in the forecasts of meteorologists. Futurology is considered to be a blend of science and art.

The time dimension. The word "future" is one of three quite general terms applied to time, the other two being "past" and "present." Of course, these are human constructs, terms of convenience. Time is a dimension of

existence, a continuum that is relative to place, context, and observer. It is common practice, nevertheless, to speak of humans' perceptions of time as extending backward from now, the present, into a past of experienced and vicarious events--and forward from now into a future of possible or probable, sought and hoped for, or to-be-avoided "events." Thus, in the sense that events can occur in a past or a future, there can be a history of the future as well as of the past.

With respect to "time in the future," futurists generally use a number of time-frame conceptions. These are:[6]

1. The "immediate" future is <u>now</u>.
2. The "near-term" future is the next one to five years.
3. The "middle-range" future is five to twenty years from now.
4. The "long-range" future occurs twenty to fifty years hence.
5. The "far" future will happen fifty years or more from now.

Another aspect of the temporal dimension is the great disparity between the time of a generation in a human family (about thirty years) or of a person's lifetime (about seventy years in the U.S.) <u>and</u> time in the universe or in our particular solar system which is measured in millions and billions of Earth years. How does one gain perspective on one's own life expectancy or that of one's children or grandchildren in comparison with the age of the Sun--10,000,000,000 years, or of Earth--5,000,000,000 years, or of the human species--perhaps 3,000,000 years? Such differences in micro-time and macro-time are extremely difficult if not almost impossible to comprehend.

<u>The global concept</u>. As Buckminster Fuller so aptly put it: "We are all astronauts!"[7] What Fuller means, of course, is that Earth is a space-ship in a relatively fixed orbit around our Sun-star, our "energy-supplying mother-ship," and that we the passengers aboard Earth-ship are "right now travelling at sixty thousand miles an hour around the sun," while at the same time we are "also spinning axially, which, at the latitude of Washington, D.C., adds approximately one thousand miles per hour to our motion. Each minute we both spin at one hundred miles and zip in orbit at one thousand miles."[8]

Those magnificant photographs of Earth taken by astronauts aboard NASA space vehicles gave us our first views of our spherical planet as a whole, as a total system, as Spaceship Earth. What was beautifully clear from those technicolor enlargements was a planetary landscape devoid of political boundaries--a multicolored spheroid looking very much like a gigantic microorganism on a slide beneath the high-powered lens of a microscope. Organism is an appropriate metaphor, for Earth is not only a complete biosphere but it is also dependent for existence on its sun-host as a source of sustaining gravitation, energy, and light.

We have just recently become aware of the interdependence that exists among Earth's several hundred human societies, another key concept related to a global perspective.

> When we talk about such things as the Shrinking Planet, or Spaceship Earth, or the Global Village, we are acknowledging the fact that the human species is being more tightly bound together with each passing day. We find ourselves living in huge global webs, although awareness often comes only when some sudden jolt in one of the strands--like the Energy Crisis--reverberates through all the others.[9]

To emphasize planet-wide interdependence as a key concept in futurology is not meant to suggest that futurists have no interest in smaller social units such as a single nation, a city or town, or even a local corporation. The reason for a global focus is that social issues, as manifest in any locale, are more and more interwoven within and between societies. Social futures must therefore take into account global contexts.

The concept of planning. Humankind seems always to be ambivalent toward social change. Philosophical issues often are stated as dilemmas: free will vs. determinism (or predestination), personal freedom vs. social control, disjointed incrementalism vs. long-range social planning. It becomes a question of to choose or not to choose, to set goals or to submit to the fates, to plan or not to plan for the future.

Futurists tend to accept the assumption to a greater or lesser degree that individuals, communities, and societies are free to choose among alternative futures. Thus, futurists believe that personal or social choices can

be made, even though within severely restricted limits, and that these preferred options have future consequences. They further believe that the selection process should be rational in nature, that is, that selection of a preferred future should be reached through comparative analysis of a range of scenarios or alternative future contexts. Futurists accept, however, that an intimate aspect of every choice is the normative or value dimension. To choose a set of goals and attendant probable consequences (from among several such sets) is not solely a rational enterprise, but is value-laden at every point.

Making choices among alternatives and setting goals and priorities are inescapable facets of futurism and components of the general process of planning. Applied futurology then is the development and pursuit of planned social change. Planning is a form of rational decision making, based on value premises, with a hopeful attitude toward the future, and is partly if not wholly anti-fatalistic.

Self-fulfilling and self-defeating forecasts. We are not totally at the mercy of a predetermined future. We are able to describe alternative futures, and then to choose those futures we desire and work toward their achievement. Conversely, we can identify those futures we do not want to occur and work for their defeat. Thus, as both creatures and creators of futures, we can identify and specify alternative futures and then choose which ones to support or oppose.

Two phenomena connected with the specification of probable futures are "self-fulfilling" and "self-defeating" psychological forces. For example, to highlight a probable short-fall of petroleum to process into gas and oil for automobiles may tend to "cause" or "create," at least in part, just such a shortage. In such a case, the actual forecast of an event becomes a partial cause of bringing it about--a self-fulfilling forecast. If we know in detail the probable horrors of thermonuclear war, for example, this awareness may become a self-defeating "cause" that will prevent the occurrence of such an event.

Types of Future Orientations

One quite oversimplified way of differentiating the basic orientations of futurists is to try to determine how, in general, they view change and

continuity; beginnings, transitions, and endings; and hope (optimists or cornucopians) and despair (pessimists or catastrophists). Those futurists who tend to envision continuity from past, through present, to future and who view change as slight perturbations in a generally stable society can be called Extrapolationists. In the futures context, to extrapolate is to extend into the future a trend or pattern that has been identified from past-to-present data on one or more variables. For example, if the population growth rate of a small city like Boulder, Colorado, has stayed at two percent per year for the past 20 years, one could extrapolate from such a trend that the two percent rate will continue for the next decade. Extrapolations usually appear in the form of time series graphs such as shown in Figure 1. Here, the baseline (X axis) is time (1960 to 2000), and the vertical (Y axis) is a factor such as population or energy. It is also common in time series graphs to draw past-to-present trend lines as solid lines, while depicting present-to-future trends as broken lines.

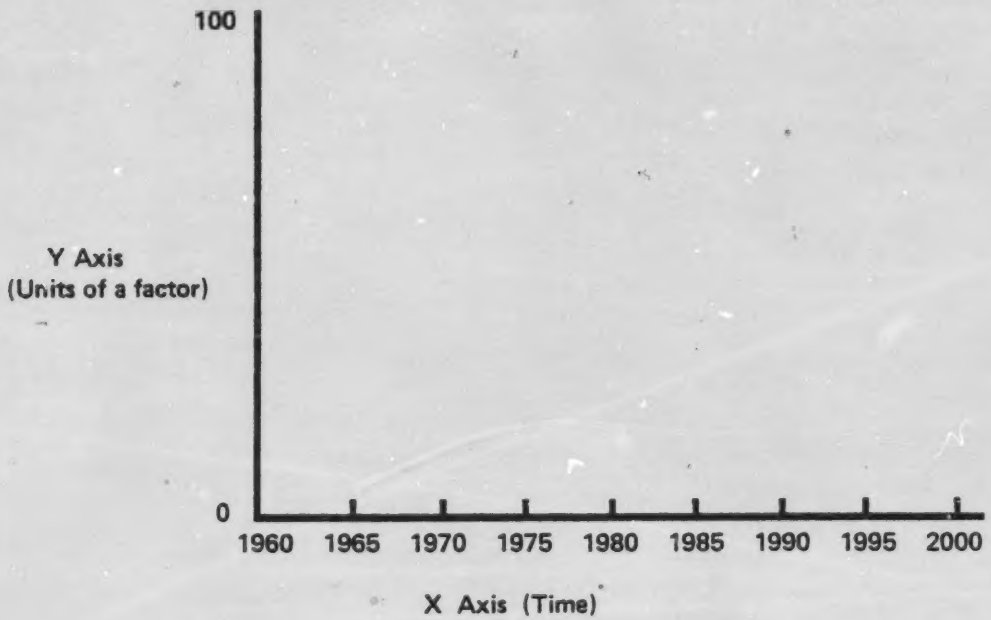

Figure 1. A Model Time Series Graph

Extrapolationists usually view the history of a society as a positive evolvement to a present, desirable status quo, which naturally suggests a social future similar to that of the past. Extrapolationists view transitions (or transitional eras) as gradual, extending over long expanses of time, usually involving little trauma and upheaval. Extrapolationists tend to be optimists or cornucopians, seeing "more and better" as characteristics of the future. They can, however, be pessimists, viewing the past-to-present-to-future continuum as an unbroken pattern of negative trends that will continue unchanged until a final holocaust or catastrophe occurs.

Typically these catastrophic Extrapolationists hold no hope for the reversal of fatal trends that sooner or later will lead to some form of devastation such as nuclear war, the collapse of Western industrialized nations, or the total degradation of planetary life-support systems ending in the extinction of the human species. Figure 2 represents a hypothetical pattern of extrapolation leading to catastrophe (in a nation like the U.S.), caused by the twin trends of exponential growth in energy use and rapid depletion of oil reserves. Disaster strikes just prior to the year 2010!

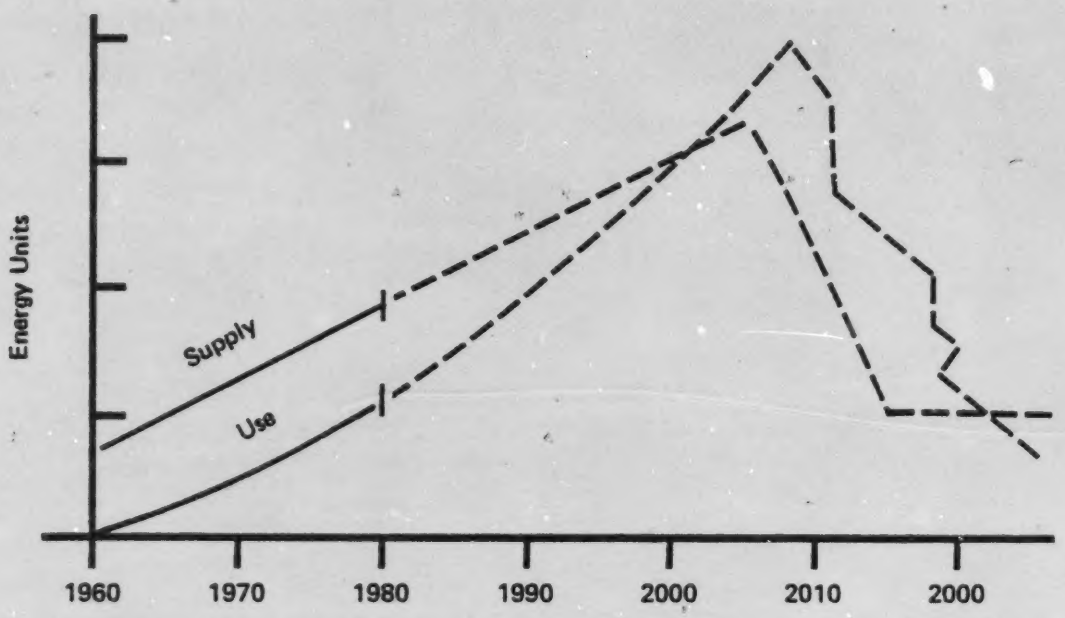

Figure 2. Supply and Use of Energy (Oil) -- 1960 – 2020

A second basic orientation to the future is that of the Transformationalist. This futurist tends to view the panorama of social history (including future "history") as a series of revolutionary changes. Granting that stability is a necessary condition for the existence of any society, the Transformationalist focuses attention on the shifts in culture, social institutions, social values, and technology which serve as points of demarcation in the evolvement of a society. The Transformationalist sees change as a basic ingredient in all societies today. In Western societies, the Transformationalist sees the present as an era of revolutionary change in all arenas of social life, which assumes a shift from one way of life to a new mode of existence.

In his brilliant work, The Transformations of Man, Lewis Mumford describes poetically the major emphasis of Transformationalists: "At a moment of ripeness, the unseen will become visible, the unthinkable thought, the unactable enacted; and by the same token, obstacles that seem insurmountable will crumble away."[10] This is the essence of a transformation--from animal to human, from nomadic to sedentary, from industrial to postindustrial, from birth to death to rebirth.

The S-shaped or sigmoid curve might be considered as the most appropriate metaphorical symbol of Transformationalists. Figure 3 shows a sigmoid curve in the field of biology. Due to such environmental contraints as air and food, the population growth of fruit flies (in a closed system--a large glass jar) slows at about 100 flies and become ZPG (zero population growth) at roughly 225 flies--all in the span of 38 days.

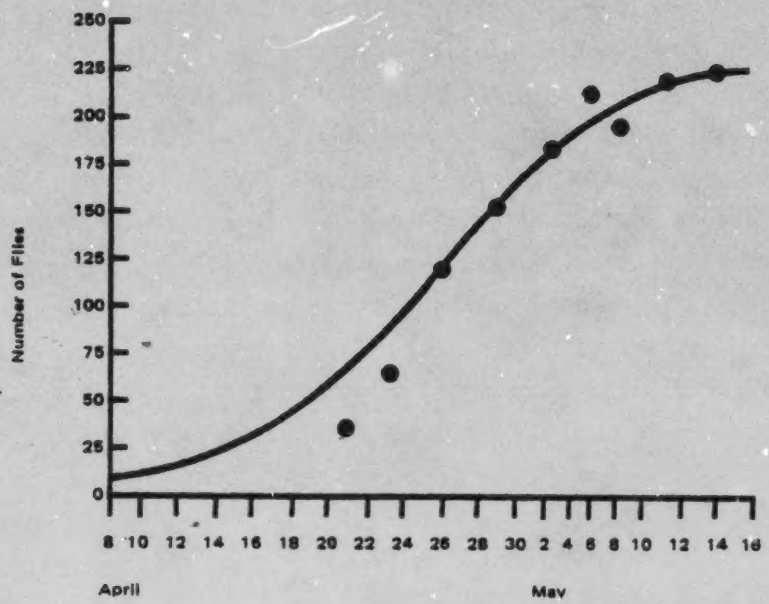

Figure 3. Growth of fruit-fly population. From R. Pearl, The biology of population growth. Copyright 1925 by A. A. Knopf, Inc. and renewed 1953 by Maude de Witt Pearl. Reprinted by permission of the publisher.[11]

Jonas Salk has popularized the sigmoid curve because it highlights the concept of limits, a concept he believes is crucial to future human survival.[12] Salk thinks that Western societies are currently in transition from an era of growth to an era of limits. As such, point A on the sigmoid curve (Figure 4) corresponds to the era of growth; X, the point of inflection, refers to today, a time in which we are not sure if A will continue into the future or if B will occur; and point B is analogous to an era of limits, which may, in turn, become a steady-state era, point C.[13]

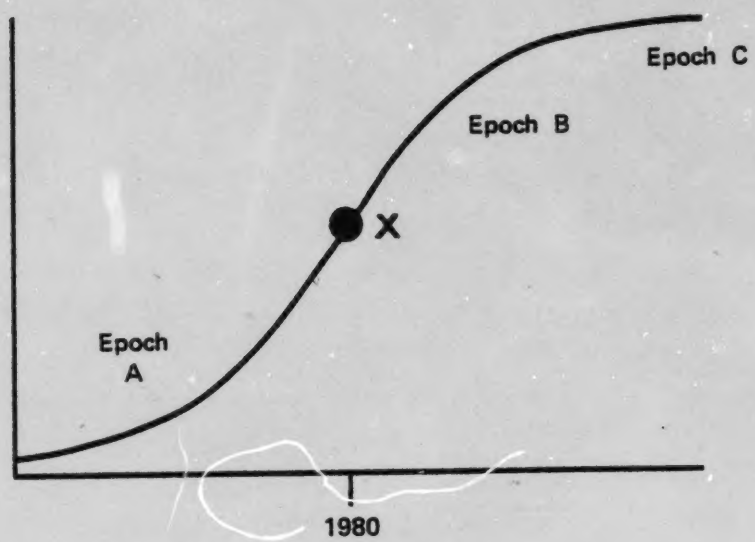

Figure 4. The Sigmoid Curve of Transformation.

Another way of illustrating the Transformationalist perspective is to use overlapping bell-shaped curves, with the top of each bell representing the peak or height or Golden Age of each civilizational type. Figure 5 depicts Daniel Bell's sequence of societal types--preindustrial, industrial, postindustrial (approximate dates and use of curves mine).[15]

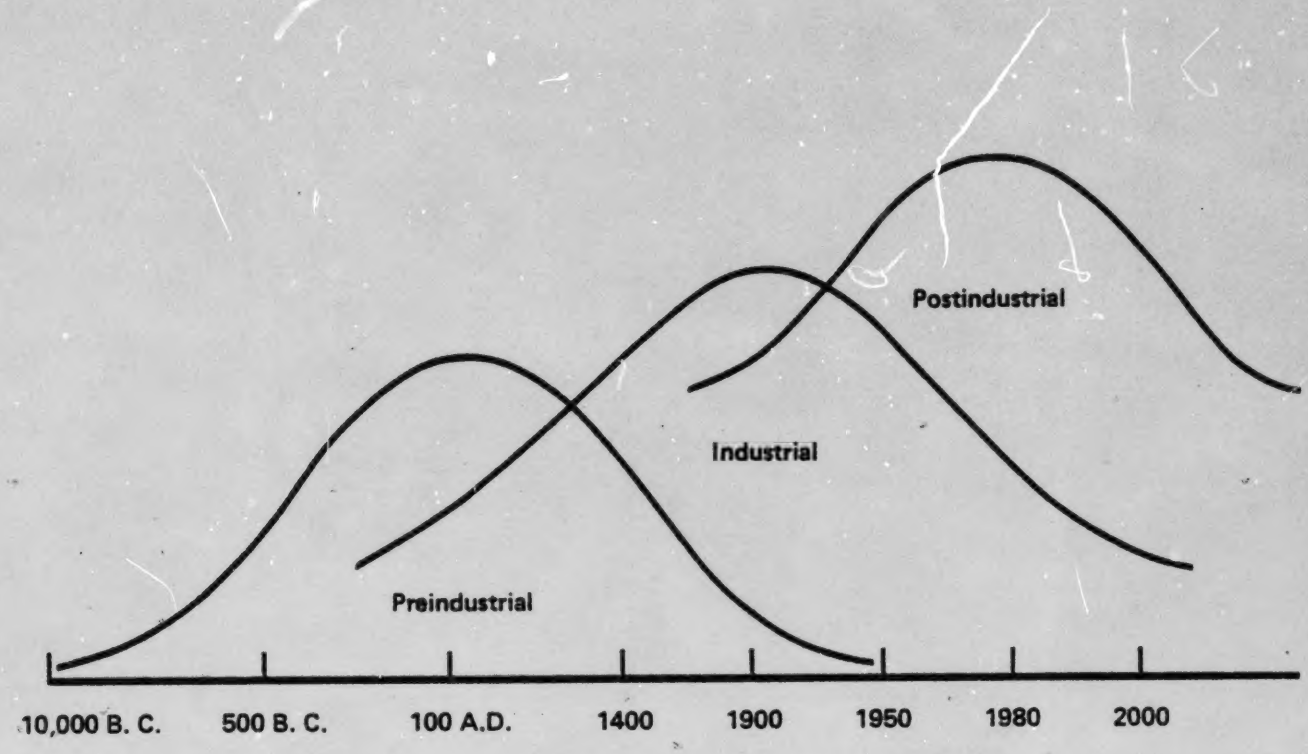

Figure 5. Societal Stages in Western Civilization

Notice that each successive curve subsumes (rises above, yet includes) the previous stage(s). This is to take into account the fact that, although an agrarian society transforms into an industrial society, the new type of society still requires primary goods such as food, clothing, and shelter. The three societal types are differentiated along at least four dimensions--resource, mode, technology, and design; these are summarized in Figure 6.

	Preindustrial	Industrial	Postindustrial
Resource	Raw Materials	Energy	Information
Mode	Extraction	Fabrication	Processing
Technology	Labor-Intensive	Capital-Intensive	Knowledge-Intensive
Design	Game Against Nature	Game Against Fabricated Nature	Game Between Persons

Figure 6. Characteristics of Daniel Bell's Societal Stages.[16] From D. Bell, The cultural contradictions of capitalism, 1976. Reprinted by permission from Harper & Row, Basic Books, 10 East 53rd St., New York, N.Y. 10022.

One should also take note of the overlap in time of the three societal types in Figure 5. This feature recognizes that social change is a paradoxical phenomenon: While one type is losing momentum, its successor is aborning, barely visible on the horizon of social life. Thus, the futurist Willis Harman points to the "lead indicators of impending social change" that have been visible in our society for at least a decade: alienation; purposelessness; lowered sense of community; increased rates of mental illness, of violent crime, of social disruptions, of the uses of police to control behavior, of public

acceptance of hedonism and lax public morality; heightened interest in non-institutionalized religious activity; and signs of anxiety and helplessness about the future. For Harman, these are early warning signals of the coming transformation that he calls "metanoia," by which he means a transformation of mind, of consciousness.[17]

Metanoia, says Harman, will basically alter the futures projected by Extrapolationists such as Herman Kahn. Kahn originated the "basic long-term multifold trend" toward:

1. Increasingly sensate (empirical, this-worldly, secular, humanistic, pragmatic, utilitarian, contractual, epicurean, or hedonistic) cultures
2. Bourgeois, bureaucratic, "meritocratic," democratic (and nationalistic?) elites
3. Accumulation of scientific and technological knowledge
4. Institutionalization of change, especially research, development, innovation, and diffusion
5. World-wide industrialization and modernization
6. Increasing affluence and (recently) leisure
7. Population growth
8. Decreasing importance of primary occupations
9. Urbanization and (soon) the growth of megalopolises
10. Literacy and education
11. Increased capability for mass destruction
12. Increasing tempo of change
13. Increasing universality of these trends.[18*]

What Harman anticipates is a shift to metanoia combined with the emergence of a transindustrial society. Metanoia would comprise a new ethos to deal with growth dilemmas and limited planetary resources; to provide work-role satisfaction, both economic and psychological; to insure control over technology without sacrificing individual liberty; and to justify a lowered

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*From H. Kahn and A. J. Wiener, "Faustian powers and human choices: Some 21st century technological and economic issues." In W. Ewald, Jr. (Ed.), Environment and change, 1968. Reprinted by permission from the Indiana University Press, Bloomington, IN 47401.

standard of living as the price of a heightened quality of life. The transindustrial society is a steady-state economic system. Further, it is a society in which

> concern would shift to the inner frontiers of mind and spirit; . . . social institutions would have to serve persons; . . . learning would be a prime concern at all phases of life and of all social institutions. . . . This future transformation to a transindustrial society is not predictable, automatic, or even necessarily probable. All one can say is that there does appear to be a tendency toward this metamorphosis.[19]

As with Extrapolationists, Transformationalists can be optimistic or pessimistic. Harman is clearly an optimist, if not a romantic utopian. On the other hand, Robert Heilbroner, who wrote An Inquiry Into the Human Prospect, is a distinct pessimist. He views present industrialized nations, whether capitalist, socialist, or communist, as doomed in the long run, destined to transform into authoritarian societies (perhaps a kind of benevolent fascism) because of the needs to coerce citizens into limiting their wants and to protect the many social commons from becoming despoiled.[20]

A few futurists, Extrapolationists and Transformationalists, view the future from a religious perspective. They often see, in the near or distant future, the coming of the millennium--a time when earthly disasters precede the second coming of Christ which marks the beginning of bliss and happiness on Earth. Or, they anticipate endings--of human existence on Earth, or of divisiveness among religions. These futurists might be called Millennialists (orientation toward great happiness or human perfection) or Eschatologists (orientation toward endings or final events, the end of the world).

Human Futures

There are numerous ways to map the territory of the future--from statistical extrapolation to imaginative science fiction, from demography to poetry, from architectural forms to synthesized music. Topics of interest to futurists are wide ranging and almost unlimited in number. Four domains, however, receive considerable attention from many futurists who reflect a

broad, general perspective in their forecasts. These domains are: (1) emerging values (at the personal, community, and societal levels); (2) frontiers of knowledge (in current academic disciplines and in the "slippery realms" of consciousness and paranormal phenomena); (3) technological developments (in weapons systems, in medicine and pharmacology, and in genetic engineering); and (4) persistent social issues (such as energy source depletion, hunger, poverty, pollution). Trends and forecasts will be examined in each of these four domains.

The Domain of Values

"The unity of a culture consists in the fact that all valuations are mutually shared in some degree."[21] A system of values, an ideology, is the infrastructure that supports and gives coherence to all of a society's institutions. In each society this values/ideology base is relatively stable, though at crucial times it enters a state of flux when new emergent values challenge traditional values. At such times, the resulting conflict and strife within a society usually lead to a modification or new synthesis of the values/ideology base, or to an almost totally new infrastructure and, therefore, to a new society born of revolution.

It is highly likely that in the modern world social values are in constant turmoil, either bubbling just beneath the surface of daily events or boiling over in the debates over ubiquitous social issues. Constant tension seems to exist in every society between traditional values and emerging values, creating perturbations in the infrastructure that normally result in the evolvement of a new set of values. Clearly, such is the case in the United States today.

The American republic was born of revolution, yet its ideology was an importation from the shores of western Europe and the islands of Great Britain. American values derived from five related (and on occasion contradictory) traditions: (1) the Protestant ethic, (2) the Puritan temper, (3) bourgeois capitalism, (4) republican democracy, and (5) Western philosophy. Like one of the five-pointed stars in the flag of the new American nation, these five value clusters were merged into a new ideology.

At the heart of the American ideology are the Protestant ethic and the Puritan temper, two "codes that emphasized work, sobriety, frugality, sexual restraint, and a forbidding attitude toward life. They defined the nature of moral conduct and social respectability."[22] They were combined in "the man of action, who was also the man of God."[23] Separately, their exemplars were Benjamin Franklin, the man of action, "the pragmatic and utilitarian Protestant," and Jonathan Edwards, the man of God, "the aesthetic and intuitive Puritan."[24] In these two 18th-century figures we have "the essence of the American character: the piety and torment of Jonathan Edwards, obsessed with human depravity, and the practicality and expedience of Benjamin Franklin, oriented to a world of possibility and gain."[25]

The complementary concepts of the Puritan temper and the Protestant ethic contributed to what Gunnar Myrdal has called "the American Creed"[21]--the values of self-denial or endurance of distress, deferred gratification, sexual restraint and chastity, frugality and thrift, striving to achieve or resolution or industriousness, self-control and temperance and moderation, order and punctuality, humility and charity, and the survival of the fittest as derived from the Calvinist idea of predestination or "the elect of God."

As Max Weber argued so persuasively and eloquently, there is an intimate relationship between the Protestant ethic and the practice of bourgeois capitalism. The values in each tradition are mutually supportive: The successful entrepreneur is easily justified and confirmed by appeal to such values as resolution, frugality, industry, order, punctuality, striving, and especially to the concept of the elect of God who might be viewed as preordained to "success."[26]

The values inherent in bourgeois capitalism are the profit motive, competitiveness, scarcity as a function of unlimited demand with limited supply, a free market economy, contrived demand through advertising and "forced" obsolescence, social class distinctions based on wealth and possessions, materialism, acquisitiveness, conspicuous consumption, meritocratic hiring and promotion, and the priority of private property ownership rights.

In addition to Protestant, Puritan, and capitalistic values, the American Creed also comprises democratic value orientations. These are

enhancement of human dignity, rational consent of the governed, rule of the majority, guarantees of individual and minority rights and of due process, the quality of freedom or liberty or independence, and the search for equality and equity in conjoint living.

Finally, the ideology of United States society contains a number of values that have pervaded the development of Western civilization and are embedded in Western philosophy and science. These value positions are rationality, empiricism and experimentation, humanism, dualistic analysis, and various forms of reductionism, especially the quantification of phenomena.

The American Creed, then, is a composite ideology that gradually coalesced during the 17th and 18th centuries and has endured with some modification for the past 200 years. Even though the structure of American society has changed in the last two centuries the ideological infrastructure has remained intact.

> It is in the character of ideologies not only to reflect or justify an underlying reality but, once launched, to take on a life of their own. . . . Thus an ideology gnawed at, worried to the bone, argued about, dissected, and restated by an army of essayists, moralists, and intellectuals becomes a force in its own right. [27]

An ideology is most apt to be questioned during times of social trauma and strife, during what are commonly called "hard times" or when the society is engaged in war. Thus, in America, changes in social values and in the conditions of social living occurred for the most part in conjunction with wars and economic crises, but also over longer stretches of time in response to powerful though slowly evolving trends. Events and developments in the history of the United States which had the greatest impact in changing social values and structures were the Civil War, World War I, the Great Depression, World War II, the Vietnam War, urbanization, industrialization, and the civil rights movement--and selected technologies such as the steam engine and railroads, the factory system, the internal combustion engine and automobiles, the airplane and rocketry, and electronic communications: radio, television, and computers. The list could clearly be extended, but the point is that a system of social values possesses a persistent power to endure, yet is

responsive to and can be transfigured by potent events and pervasive long-term trends.

Since World War II, several social scientists and other intellectuals have observed both value shifts and the appearance of potentially emergent values in the United States and in other Western industrialized societies. For most of these analysts, the decade of the 1960s--the Vietnam War, the civil rights movement, sexual liberation, urban riots, and the youth rebellion--was a particularly crucial watershed.

In a 1977 survey of citizens in western European nations, Canada, and the United States, Ronald Inglehart and his associates concluded that "the values of Western publics have been shifting from an overwhelming emphasis on material well-being and physical security toward greater emphasis on the quality of life."[28] What these researchers were after was the extent to which the various publics were shifting from adherence to "Materialist" values to a preference for "Post-Materialist" values. In this study, the broad constructs "Materialist" and "Post-Materialist" subsumed categories of "needs" as identified by Abraham Maslow. Maslow has suggested that there is a hierarchy of basic human needs in which individuals must have their needs fulfilled at one level (lower) before they seek to fulfill needs at another level (higher). He describes five levels of needs in ascending order: (1) physiological sustenance needs or physical needs; (2) safety needs or needs to be safe from danger, pain, discord, etc.; (3) belongingness and love needs; (4) esteem needs--self-respect, self-esteem, the esteem of others; and (5) the need for self-actualization--being what one is capable of becoming.[29] The Inglehart team combined these five needs into two groups: Physiological Needs (which included sustenance and safety needs) and Social and Self-Actualization Needs (which combined belonging, esteem and intellectual and aesthetic actualization needs). They then described a person as "Materialist" in orientation who pursued Physiological Needs, and one who sought mainly Social and Self-Actualization Needs as "Post-Materialist" in outlook.

In summarizing the results of this study, Inglehart generalizes that:

> beneath the frenzied activism of the 1960s and the seeming quiescence of the 1970s, a Silent Revolution has been occurring that is gradually but fundamentally changing political life throughout the Western world.[30]

He also expresses concern, however, about some of the changes his group observed. He says:

> We seem to be witnessing a weakening of institutional restraints, a diminishing reliance on functional rationality and its chief tool, technology--to some extent even a rejection of them. These trends are alarming because in excess they would be disastrous.[31]

If the decade of the 1970s is the Age of Quiescence it may be because the United States needed to catch its breath after the whir of the 1960s and also because the seeds of change sown in the '60s have been incubating, and are just now breaking ground and will come to bloom in the '80s. Perhaps the 1970s are the bridge between an older Materialist world-view and an emerging Post-Materialist orientation.

At least three writers see a present-to-future trend in the increasing appeal of hedonistic and narcissistic values. In their classic The Year 2000, Herman Kahn and Anthony Wiener identify a "Long-Term Multifold Trend of Western Culture," a list comprised of thirteen general trends, the last of which forecasts the increasing universality of the preceding twelve. One of the twelve forecasts is specific to values and lifestyles, and projects an "increasingly sensate" culture--empirical, this-worldly, secular, humanistic, pragmatic, utilitarian, contractual, epicurean, and hedonistic.[32]

More recently, historian Christopher Lasch, in his best seller The Culture of Narcissism: American Life in an Age of Diminishing Expectations, argues that after the turmoil of the '60s, people retreated within themselves and pursued purely personal ends such as self-improvement and psychic awareness. What has tended to dominate the decade of the '70s, suggests Lasch, is the "cult of the self."[33] He observes that today "to live for the moment is the prevailing passion--to live for yourself, not for your predecessors or posterity."[34]

In dealing with value shifts, a common practice is to present value rubrics in two parallel columns, with the list on the left referring to traditional values, those from which emergent values, the list on the

right, are shifting away. The list on the left may be titled "Traditional" or merely "From," while the parallel list on the right may be headed "Emergent" or "To." The following represents the author's view of current value shifts in American society:[35*]

Values Shift

From (Traditional Values)	To (Emergent Values)
--self-denial, endurance of stress, and deferred gratification	--pursuit of immediate pleasures or hedonism
--sexual taboos and constraints	--sexual permissiveness or openness
--self-control, belief that hard work yields success, striving to achieve	--self-actualization and self-expressiveness, acceptance and expression of feelings, self-realization
--"survival of the fittest"	--"survival of the wisest," the individual's survival entwined with species, global survival
--progress equated with growth, promotion of increased consumption and number of consumers	--limits to growth; search for ecological balances; stress on qualitative aspects of progress
--competitiveness; a win-lose, either-or attitude	--cooperation, conflict resolution and reduction, win-win attitude
--materialism, acquisitiveness, and conspicuous consumption	--focus on essentials, greater desire for quality and durability of goods
--social class distinctions based primarily on wealth	--greater concern for equality and equity, class distinctions based on multiple criteria (de-emphasis on accumulated wealth) which will tend to blur class lines

*From R. D. Van Scotter, R. J. Kraft, and J. D. Haas, Foundations of education: Social perspectives, 1979. Reprinted by permission from Prentice-Hall, Inc., Englewood Cliffs, NJ 07632.

--preoccupation with private property ownership rights	--increasing pressures to insure basic human rights--nationally and globally; greater concern for "the commons" which are shared collectively (e.g., water, parks, air, neighborhoods)
--government by isolated elected officials in state and national capitals	--government by association, involvement, and participation of the entire citizenry; increased pressures from interest groups
--nationalism, exclusive national sovereignties as loci of loyalties, independence of nation-states	--world order models, trans-national economic groupings as bases for regional political groupings (e.g., European Common Market), regional and world federalisms, interdependence of nations.
--freedom or liberty or independence, individualism	--mutuality of concern, cooperative processes, greater attention to interpersonal relations and quality of conjoint living
--rationalism, empiricism, scientism, dualistic analysis, reductionism, and quantification	--renewed reliance on faith and feeling, practice of meditative modes, global humanism, blending of Taoist and Buddhist world views with those of Judaeo-Christian tradition, abandoning the search for value-free knowledge, greater trust in all human ways of knowing

Using the same type of format, Ian H. Wilson derived the following value shifts:[36]

From	To
--considerations of quantity ("more")	--considerations of quality ("better")
--the concept of independence	--the concept of interdependence (of nations, institutions, individuals, all natural species)
--mastery over nature	--living in harmony with [nature]
--competition	--cooperation
--doing and planning	--being
--the primacy of technical efficiency	--considerations of social justice and equity

--the dictates of organizational convenience	--the aspirations of self-development in an organization's members
--authoritarianism and dogmatism	--participation
--uniformity and centralization	--diversity and pluralism
--the concept of work as hard, unavoidable, and a duty	--the concept of work as purpose and self-fulfillment, recognition of leisure as a valid activity in its own right.

Finally, in a survey pilot study, "Changes in U.S. Values," 58 respondents, "high-level scientists" or "science administrators," foresaw that by the year 2000 there would be "a definitely continuing commitment to American values, very much along present-day lines, except for an increased emphasis upon social and a decreased emphasis upon religious values." Further, in regard to specific values, these respondents anticipate "a distinct strengthening of 'selfish' values," such as "'one's own pleasure,' 'physical well-being and comfort,' 'economic security,' 'convenience,' and 'leisure'"; and "a strengthening of mankind-oriented values," such as "'social justice,' 'peace,' and 'internationalism.'" Also, these members of the scientific community

> firmly anticipate substantial changes with respect to various categories of values: . . . increased emphasis [on] service and other-regarding values, material values, aesthetic values, social values, international values, [and] intellectual values; and decreased emphasis [on] religious values and parochial values.[37]

The Domain of Knowledge

As a species, humans learn from their own experiences as well as from those of generations that preceded them. Human beings both preserve and create knowledge. Further, our knowledge growth occurs both by normal, gradual accretion and, on occasion, by revolutionary leaps or shifts.[38]

"In our time," says Soviet physicist Arkadii Migdal, "the frontiers of the possible have been pushed back so far that they merge into those of wonderland."[39] For physicists and astronomers, the universe has become more mind than material, more idea than matter, more filled with paradox than with certainty. Mysterious, strange wonders abound: quasars, pulsars, and black holes; backwards time, antimatter, and negative mass. We are

insatiably curious: leaving footprints on the moon and a "dead" robot on Mars. We beam messages from a radio telescope at Arecibo, Puerto Rico, toward this and that distant star, always in search of a neighbor, a soul-mate, a friend in the universe. What will we find? What will we learn today, tomorrow, next year? What will emerge from Pandora's Box by the year 2000?

We can conclude from the history of our species that knowledge is continually incomplete, yet almost always sufficient for the survival of a people at a particular time and place. We constantly seek to alter and extend the frontiers of knowledge in every realm, but each society "chooses" a select set of realms in which to concentrate creative efforts. Thus, in ancient Egypt the clergy and aristocracy created knowledge primarily in the realms of architecture, agriculture (especially in irrigation), military science, and religion; while in the United States during the 19th century the growth of industrialization was accompanied by spurts of new knowledge in the realms of physics, chemistry, metallurgy, and engineering. The flow of knowledge production is generally in those directions most compatible with a society's images of the future.

Probably the most productive mode for creating knowledge in the past four or five centuries has been science. By "science" is meant the methods employed rather than the scientific disciplines involved (e.g., physics). Science-as-method is a set of assumptions and procedures for describing and emplaining phenomena. These usually include both inductive and deductive logic, empiricism and experimentalism, a belief in an <u>orderly</u> physical universe which can be directly comprehended in a rational manner, objective control of all variables, public and replicable procedures and conclusions, and a faith that the objective world is essentially separate from and independent of the subjective experience of the researcher.

Faith in science as <u>the</u> path to reliable and comprehensive knowledge is typically justified by pointing to one or more of the following aspects of science: (1) its simple yet elegant explanations of physical phenomena; (2) the ingenuity of its heroes: Copernicus, Galileo, Kepler, Newton, Maxwell, Einstein, Watson and Crick, and perhaps a hundred others; (3) its cumulative

growth from one historical synthesis to the next; and (4) its use as a springboard to invention and technology.

In the past few decades, a number of philosophers and a few scientists have questioned one or more of the premises upon which the scientific enterprise has been constructed. Some of the critics challenge the supremacy of science as the mode of knowing about reality, while others castigate scientists for their seeming lack of concern for values, especially in regard to social issues. Still others point to what they consider to be outmoded assumptions of science such as: (1) Reason is the supreme tool in discovering new knowledge! (2) The universe is inherently orderly and physical! or (3) The only reliable truth is that which is empirically verifiable![40]

In the realm of knowledge, the future holds prospects for new knowledge derived via the current paradigms in science; the probable emergence of new paradigms and new disciplines which incorporate subjective experience, value dimensions, and the neglected phenomena of paranormal or psychic human behaviors; the development of new modes of knowledge creation, especially in the field of futures forecasting; and a new generation of technological inventions.

Of the 100 or so disciplines of knowledge, it is difficult to detect in which ones major significant breakthroughs will occur. Some clues do exist, however, as to where discoveries may take place. For example, in the natural sciences the momentum seems to have shifted from physics to biology, especially biochemistry, where investigations in brain research and in recombinant DNA research seem to be most promising. Kenneth Clark asserts:

> We might be on the threshold of that type of scientific, biochemical intervention [into the brain] which could stabilize and make dominant the moral and ethical propensities of man and subordinate, if not eliminate, his negative and primitive tendencies.[41]

Thus, we may have the biochemistry and pharmacology of peace.

Recombinant DNA research is currently quite controversial due to its inherent danger of creating possibly lethal new organisms by accident, such as a new virus which the human body is unable to combat. Nevertheless, with appropriate safeguards, this type of research holds potential for the

production of new organisms to attack diseases in both humans and plants as well as to eliminate many genetic defects.

Then there is the recent interest in split-brain research, in the biopsychology of the left and right hemispheres of the brain. At this time we can tentatively conclude that the left hemisphere controls "analytic and reductionist" thinking while the right side emphasizes "more holistic and integrative" thought.[42]

In the last decade interest has increased in the field of consciousness research--the study of altered states of subjective awareness and of extra-sensory perceptions and skills. Curiously, many investigators have come to this area from backgrounds in the natural sciences, especially physics. As Jacob Bronowski put it: "Knowledge is our destiny. Self-knowledge, at last bringing together the experience of the arts and the explanations of science, waits ahead of us."[43]

The great frontier of future knowledge is the study of the person--of mind, body, and spirit.

> Among the most fundamental challenges to present belief systems is the concept that consciousness is primary to matter. . . . From an Eastern perspective the dynamics of consciousness are the forces governing the behavior of matter.[44]

As the Nobel laureate in physics, Werner Heisenberg, so aptly stated:

> It seems. . .that developments in many fields of science and technology are running in the same direction: away from the immediate sensory present into an, at first, uncanny emptiness and distance, whence the great connections of the world become discernible.[45]

There is an intimate and profound link to be found between the inner space of the individual and the outer space of the stars.

As to new knowledge paradigms and research methods, Willis Harman forecasts that by 1994 the following will be the premises upon which a new science will be predicated:

1. Knowledge will be seen as inclusive rather than exclusive. . . .

2. Science will be eclectic in methodology and in its definition of what constitutes knowledge. The controlled experiment will not be viewed as the only way to revealed truth . . . .

3. The new knowledge paradigm will be hospitable to some sort of systematization of subjective experience, the domain which has heretofore largely been left to non-science--the humanities and religion. Science will include the study of those experiences from which we derive our basic value commitments.

4. Science will foster open, participative inquiry, in the sense of reducing the dichotomy between observer and observed, investigator and subject. . . .

5. Science will be moral, in the sense of investigating what values are wholesome for man (much in the sense that science of nutrition investigates that foods are wholesome for man), rather than a "value-free" inquiry.

6. Science will highlight a principle of complementarity, or reconciliation of such "opposites" as free will and determinism, materialism and transcendentalism, science and religion.

7. The new knowledge paradigm will incorporate some kind of concept of levels of consciousness, or levels of subjective experience, such that concepts and metaphors appropriate to one level do not necessarily fit another.[46]

Perhaps the most significant potential development with respect to the future in the domain of knowledge is the emergence of "a knowledge society." The originator of this term, Robert Lane, describes the knowledge society as:

> one in which, more than in other societies, its members:
>
> --inquire into the basis of their beliefs about man, nature and society;
>
> --are guided (perhaps unconsciously) by objective standards of veridical truth, and, at upper levels of education, follow scientific rules of evidence and inference in inquiry;
>
> --devote considerable resources to this inquiry and thus have a large store of knowledge;
>
> --collect, organize and interpret their knowledge in a constant effort to extract meaning from it for the purposes at hand; and
>
> --employ this knowledge to illuminate (and perhaps modify) their values and goals as well as to advance them.[47]

In a similar vein, the popularizer of the concept of "postindustrial society," Daniel Bell, considers the production and processing of information and knowledge to be one of the crucial characteristics of postindustrialism. He sometimes refers to this characteristic as "intellectual technology" or the blending of research and development--an emphasis on processing rather than extracting (preindustrial society) or fabricating (industrial society).[48]

The Domain of Technology

Every culture, every society has a technological base--a set of common tools and techniques. Technology consists of physical, material tool artifacts and processes and procedures as well as organizational structures. Technology includes both "hardware" and "software," both machines and processes.

Today Western industrialized societies have become ambivalent, if not jaded, in regard to our complex technologies. Although we enjoy our automobiles, we abhor their polluting effects; though we "need" our air conditioners, we fear nuclear generating plants; though we increase agricultural production by use of fertilizers, we worry about nitrogen by-products in our drinking water; we value precision and efficiency, but we deplore alienation and depersonalization. We are beginning to worry that further technological development may actually diminish our quality of life. Nevertheless, we know that the technologists are busy in their shops tinkering about with what will be a vast new array of products and processes for 21st century living.

Some of these "drawing board" technologies are:

1. New contraceptives for fertility control, probably oral and male products that will be ultra-convenient.

2. Continued developments in medical technology, especially new, improved prosthetic devices, vaccines, artificial organs, and surgical procedures.

3. Perhaps a breakthrough in cryogenics, suspending life in extremely low temperature environments.

4. Many new drugs, among which will be those designed to control behavior and modify personality, even perhaps to enhance intelligence and memory.

5. New energy types and sources, including synthetic fuels and solar applications.

6. Weapons technologies that include lethal and incapacitating biochemical products as well as probably some orbiting space threats.

7. Improvement in computer technology in many directions: greater capacity, more functions, smaller units, wider applications.

8. Improvement in agricultural technology, especially in the production of high protein foods such as fish which will be "farmed" in ocean "plots."

9. New applications of automation in factory, transportation, and home settings, including the use of robots.

10. Creation of artificial life via self-replicating molecules, recombinant DNA, and cloning.

11. Development of weather modification procedures (e.g., cloud seeding) to control precipitation as well as to eliminate the effects of natural disasters (e.g., tornadoes).

12. Hereditary defects all but eliminated by various processes of genetic engineering.

13. Continued growth and use of ovum and sperm banks which operate much like blood banks.

14. Improvement and expansion of television and other electronic communications media, to a point where home television will provide a choice of 100 or more channels.

15. Expanded space exploration, especially with respect to practical applications such as new "garbage dumps," space colonies to collect and transmit solar energy or to grow crystals, and perhaps mining of planets and moons.

16. Expansion of electronics into new markets: postal service; grocery shopping; banking; control of mass transportation systems; credit card business; distribution of newspapers, magazines, and journals.

17. New (and safer) means of producing nuclear energy--breeder reactors and fusion reactors.

These are but a sampling of the <u>expected</u> developments in technology. What cannot be anticipated are the <u>surprise</u> elements, the spectacular inventions and creations which depend on the unique genius of exceptional

individuals. In fact, in the realm of technology it would be surprising if the future contained no surprises.

The Domain of Social Issues

> Though no one can know what future historians will call our period of history, we may provisionally term it the Era of the Megacrisis because it is far more than a crisis by the standards of the past; it is a supercrisis.[49]

Another futurist has called our present predicament a "crisis of crises," which emphasizes the complexity and interrelatedness of concurrent crises.[50]

Those individual crises which comprise the megacrisis are variously named and described by different authors. Edward Cornish (founder and president of the World Future Society) lists the following issues:[51]

1. Lack of control of population growth.
2. War and violence, and the growth and threat of totalitarianism.
3. Planetary impoverishment of resources, and famine and starvation.
4. Miscellaneous possible horrors:
   - --"insane"nations
   - --nuclear crime
   - --economic collapse
   - --death of oceans
   - --climate extremes
   - --destruction of ozone layer
   - --racial strife
   - --family breakdown
   - --worldwide unemployment and underemployment
   - --loss of religious belief.

Kahn and Phelps offer two lists of issues:[52*]

Nine Mostly Understandable (and, presumably, surmountable) Issues

1. Peaks in percent rate of growth of world population and of gross world product followed by slowdowns in both.

2. Various demographic, locational, and income issues resulting from the slowdowns in No. 1 above.

3. Providing an adequate supply of food.

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*From H. Kahn and J. B. Phelps of the Hudson Institute, The economic present and future, 1979. Reprinted by permission from The Futurist, published by the World Future Society, 4916 St. Elmo Ave., Washington, D.C. 20036.

4. Transition from fossil fuels to "eternal" sources of energy--solar, thermonuclear, and renewable such as biomass (e.g., wood).

5. Expanding base or capability for other resources (e.g., arable land and water).

6. Pollution, ecological, and environmental programs to provide clean air, clean water, and aesthetic landscapes.

7. The role of space and other advanced technology.

8. Acceptable images of the future, such as the likely emergence of superindustrial and then postindustrial economies.

9. Uses of the capability and flexibility associated with the coming levels of affluence and advanced technology.

Ten Basically Uncertain (and potentially disastrous) Issues

1. Role for good or evil of science and advanced technology (e.g., genetic engineering).

2. Degree of bad luck and/or bad management.

3. Effects of U.S. superindustrial economy on environment, society, and culture of U.S. and the world.

4. Effects of U.S. postindustrial economy on environment, society, and culture of U.S. and the world.

5. Parallel developments (to Nos. 3 and 4 above) in other countries--including the likely dynamics of economic and technological development within and among various nations.

6. Popular and elite images of the present and the future, and the likely problems and opportunities caused by these images (in U.S. and other nations).

7. Other issues relating to quality of life, attitudes, values, morals, morale, and cultural change in U.S. and other nations.

8. Internal and external political, institutional, strategic and arms control issues, and control of violence generally.

9. Complicated, complex, and subtle ecological and environmental issues.

10. Stabilization or reversal of the long-term multifold trend of Western culture toward a sensate society--or its replacement by a new source of meaning and purpose.

If Kahn and Phelps take an economic orientation toward global social issues, Lester Brown views the megacrises from the perspective of an ecologist. For Brown these are the issues:[53]

1. The carrying capacity of the planet.

2. The "Tragedy of the Commons" (i.e., the dilemma that self-interest pays off when the individual uses up as much of the social common stock as he or she is allowed before using his or her own private stock).

   --overfishing the ocean "commons"
   --deforestation of the forest "commons"
   --overgrazing
   --overplowing
   --overloading air, water, and land (e.g., pollution)

3. Consequences of No. 2:

   --loss of cropland and erosion
   --polluted oceans ("the ultimate sink")
   --endangered species
   --environmentally induced illnesses
   --inadvertent climate change and natural disasters.

4. The overpopulation threat.

5. The depletion of energy resources.

6. The food shortage (and attendant problems of shortage of arable land and pollution caused by fertilizers).

7. The economic sphere: unemployment, inflation, scarce capital, and diminishing returns.

8. The unequal distribution of wealth within and between nations, and absolute and relative poverty.

9. The advantages and problems of technology.

10. The problems of accommodation and social change.

Willis Harman talks about the "five fundamental failures of the industrial era paradigm." The industrial paradigm encompasses industrialization, science, materialism, and pragmatism (utilitarianism plus hedonism). The five failures of this paradigm are:[54]

1. Failure to provide individuals with opportunities to contribute to society and to be affirmed by society in return (i.e., problems of personal alienation and efficacy).

2. Failure to foster equitable distribution of power and justice (i.e., the problems of socioeconomic classes and of rich and poor nations).

3. Failure to foster responsible technology management.

4. Failure to provide goals and visions capable of attracting loyalties and commitments (i.e., the problem of a lack of positive and compelling images of the future).

5. Failure to maintain the habitability of the planet.

Finally, this writer has developed two lists of global problems: the first includes problems at the surface in global societies--physical, material, economic, political problems; and the second lists problems which lie beneath the surface of a society--consciousness, cultural, infrastructural problems. The first list is termed "Societal Problems" and the second, "Cultural Problems."[55]

Societal Problems

1. Hunger and inadequate nutrition: starvation.

2. Depletion of natural resources: arable land, water, air, and fossil fuels.

3. Extinction of plant and animal species.

4. Inequality--between nations and within a single nation--of material wealth, risk capital, and natural resources.

5. Overpopulation by nation, region, or urban area.

6. Economic imperialism: rich nations exploiting poorer nations.

7. Threat of wars: nuclear, "acquisition," and/or "redistribution."

8. Plagues, other diseases, and inadequate medical care.

9. Environmental degradation: pollution, waste disposal, etc.

10. Crime and other violations of human and property rights.

11. Shortages: of medicines, foods, energy, fertilizers, etc.

12. Economic malfunctions: depression, recession, unemployment, inflation.

13. Credibility gaps: between and among politicians, scientists, business leaders, and citizens.

14. Illiteracy, over-schooling, and over-specialization.

15. Guerrilla warfare, terrorism, and other forms of violent aggression.

16. Social pathologies: super-affluence, conspicuous consumption, and "demonstration effects."

Cultural Problems

1. The absence of powerful substitutes for the waning belief systems of Christianity, Marxism, and Primitivism.

2. The lack of alternatives to addiction to growth and naive faith in technology magic.

3. The dilemmas of dualisms, as between intellect and feelings, analysis and commitment, and ends and means.

4. The need for a more humane cosmology other than mechanical and mathematical reductionisms.

5. The tacit acceptance of a cynical drift in human affairs.

6. The tendency toward rampant hedonism, myopic presentism, and unbridled individualism.

7. The lack of positive and hopeful symbols and dreams of global, communal, conjoint living.

8. The absence of universal, species-wide myths and epics.

9. The tendency to avoid the future, to drive into the future with one's eyes firmly riveted on the rearview mirror, the past.

10. The lack of a collective will to act when action is necessary.

What is clear from these lists is that, although local manifestations may vary, these issues pervade our globe; they are complex due to the interdependent nature of all modern nation-states; they are all interwoven, making it difficult if not impossible to deal with one in isolation from the others; and they are long-term, destined to be with us for at least the next 25 years.

With respect to the crisis of crises, one other characteristic of this web of issues is crucial. Although we enjoy closure, the satisfaction of solving a problem, the very nature of contemporary social issues causes them to resist total solution or else to yield a solution that in turn leads to a new problem.

> Perhaps the most important characteristic of this emerging kind of problem is its systemic quality. We can no longer think of problems in isolation, or look for permanent solutions. Each problem is only an aspect of a much larger system, and is thus closely linked to many other problems. . . . Dealing with a systemic problem is best viewed as an internal adjustment procedure in an ongoing, dynamic process. There is no one-time 'solution' to the problem.[56]

Probing the Future

The study of the future, like any other discipline of knowledge, has its own frames of reference and research techniques. Futurology, however, also borrows freely from other subjects such as history, sociology (and other social sciences), and literature. Most of all, futurists by and large are generalists who range across the many landscapes of reality.

Cornish has identified three "emerging futurist principles: (1) the unity or interconnectedness of reality, (2) the crucial importance of time, and (3) the importance of ideas, especially ideas about the future."[57]

Methods of Forecasting the Future

Futurists vary incredibly in the modes of "knowing" they use to probe and discover the future. From the creative literary approaches such as utopias (and of course their opposite, "dystopias") and science fiction to the technology assessment techniques used by the RAND Corporation, futurists invent facts and data or rigorously apply rules of evidence depending on their needs and inclinations. Thus, in futurology there is a place for the artist and the scientist, for flights of imagination and for intensely practical applications to public policy--even for the mystic and the psychic.

Ways of learning about the future will probably comprise many of the frontier research methods in the next half century. Currently, the modes of investigation used by futurists can be categorized as follows: genius forecasting, trend extrapolation, consensus methods, cross-impact matrix analysis, scenarios, decision trees, and systems analysis.

Genius forecasting. This method of "creating" the future is used by at least three kinds of futurists: novelists and writers of science fiction, creators of utopias, and well-informed and highly intuitive scientists and other scholars. Among the novelists and science fiction writers are Jules Verne, H.G. Wells, Aldous Huxley, George Orwell, Robert Heinlein, Ray Bradbury, Michael Crichton, and Frank Herbert. Some of the creators of utopias are B.F. Skinner, Edward Bellamy, Plato, Thomas More, plus a few authors from the first list. Scientists and scholars include Herman Kahn, Marquis de Condorcet, Alvin Toffler, some from the previous lists, and at least two individuals who represent all types--Arthur C. Clarke and Isaac Asimov. Because of the interplay of creative and intuitive, artistic and analytic, capacities within an individual, it is difficult to describe the technique of genius forecasting. As Theodore Gordon puts it:

> The method is thus embroiled in the psychology of insight; somehow an individual engaged in genius forecasting integrates possibilities which he considers important, draws from his relevant experience, and states what he thinks might be.[58]

Trend extrapolation. This approach consists of the extension of historical and present patterns into the future. It is basically a conservative, evolutionary mode of forecasting, which assumes continuous, linear, unidirectional movement from past to present to future, without the intervention of surprises or crises: "The forces which were at work to shape the trend in the past will continue to work in the future."[59] Although not limited to such evidence, much trend extrapolation relies on quantitative data--especially economic and demographic statistics. For example, Figure 7 is typical of statistical trend extrapolation, in this case a projection of world population growth by regions to the year 2000.

World Population Growth

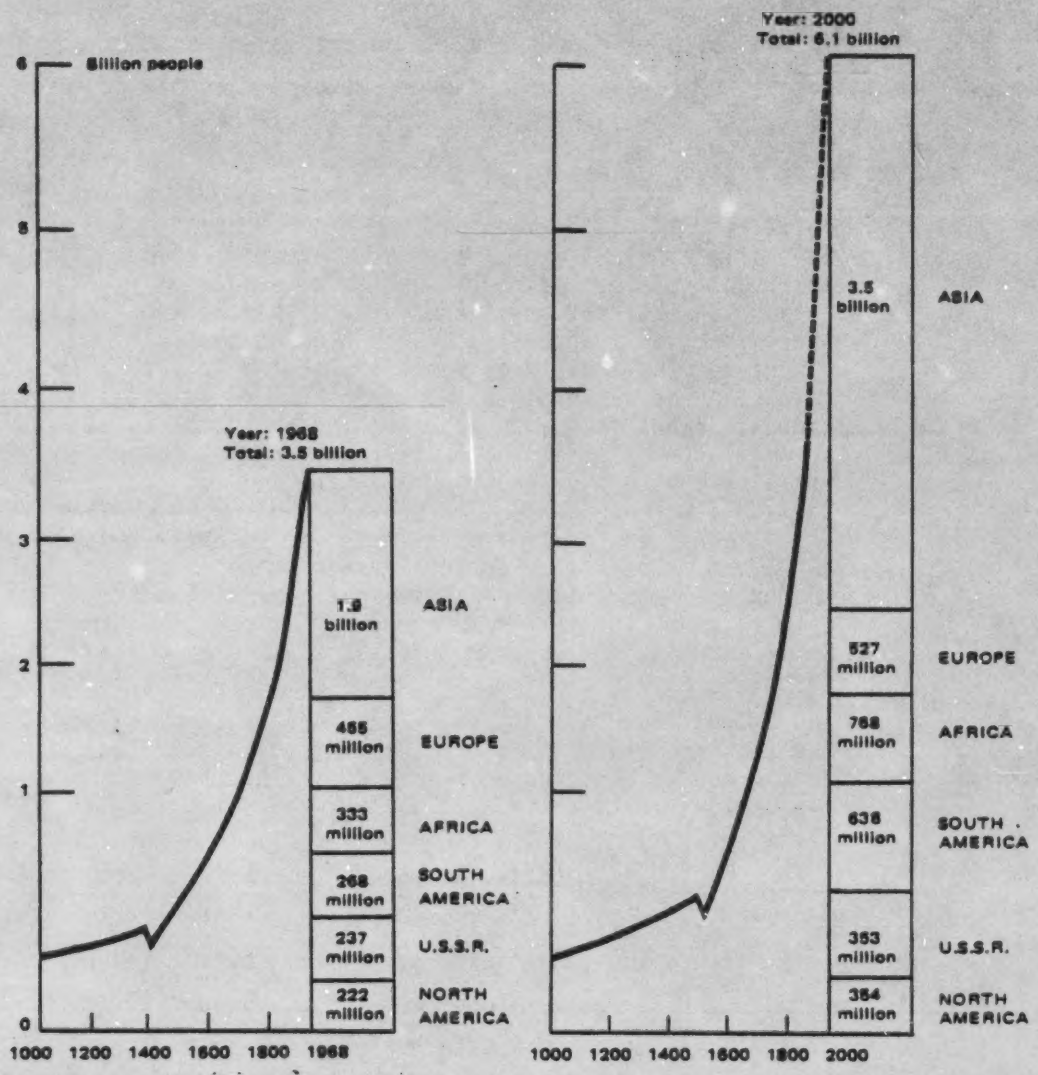

Figure 7. Population by world areas A.D. 1000-2000. From World facts and trends. Copyright © 1972 by John McHale, published by the Macmillan Publishing Co., Inc.

Figure 7. World Population Growth [60]

Consensus methods. These techniques are used to derive knowledge on topics or problems which do not lend themselves to precise formulations or experiments, but which have been probed, in one way or another, by a number of practitioners and scholars who have become expert in one of these fields. Thus, what is sought is a consensus or modal tendency on a particular problem or issue among a group of experts.

One popular consensus method is the Delphi technique:

> Generally a Delphi exercise engages experts in an anonymous debate, their opinions being exchanged through an intermediary. Anonymity exists at two levels; not only are participants unknown to each other, but the individual responses are never attributed to particular respondents. In the first round of a typical Delphi study, the participants might be asked when a future event might take place. Their answers would be collated by the experimenters and fed back to them in a second round. The second-round questionnaire would seek justification of extreme views expressed in round one. The responses would again be collated by the experimenters and furnished to the participants in a third (and usually final) round. This questionnaire would ask that the experts reassess their previous positions in view of those taken by the other participants. . . .
>
> The Delphi technique generally produces a narrowing of the initial spread of opinions and a shifting of the median as the questioning proceeds. If no consensus emerges, at least a crystallizing of the disparate positions usually becomes apparent.[61]

Simulation techniques. Social science research is relying more and more on simulation techniques to simplify the complex social relations involved in human social groups and societies. In this context, a simulation is a simplification and an approximation of some aspect of social reality. As a dress pattern is a static model of a real entity, so a simulation is a dynamic model of a social event. A simulation may take the form of a mechanical analog (such as a cockpit model for training pilots or astronauts); a mathematical analog (such as equations describing small group interactions); a metaphorical analog (such as "actors," "roles," and "stage" standing for "persons," "relationships," and "setting" or "environment"); and a game analog (such as Monopoly which simulates competition in the real estate development market).[62]

Cross-impact matrix analysis. This method is designed to take into account the fact that a human event has multiple causes, and both intended and unintended effects. "This interrelationship between events and developments is called 'cross-impact.'"[63] This technique also reveals probable new problems which are often created when another problem is "solved." For example, when medical science found ways of decreasing infant mortality rates and prolonging life expectancy, it created other problems of overpopulation and geriatric care. Or, the technologies developed and used to build automated factories also caused an increase in unemployment and obsolescence of certain human skills.[64]

Although the process of a cross-impact analysis is rather complex as a futures research methodology, it can be readily understood from a simple everyday situation. A young woman of 17, when asked about her goals for the next few years, declared that she wanted to travel some, to improve her swimming skills so that she could compete in meets, and to attend a quality college. Realizing the factor of time involved in all three activities, she used a form of cross-impact matrix in order to "see" how each goal impinged on the other two. Figure 8 represents the young woman's analysis of the interrelationships involved in the simultaneous pursuit of all three of her goals. It also serves as an example of a cross-impact matrix.

Personal Goals	Personal Goals		
How Will This Goal → Affect This Goal? ↓	To travel	To improve swimming skills	To attend a quality college
To travel	X	Except for "off-season" times, swimming would preclude travel	College work will preempt about nine months, restricting travel to summers and holidays
To improve swimming skills	Any extended travel might interfere with training and meet schedules	X	Course work at a quality college may restrict extra-curricular activities like swimming
To attend a quality college	Except for summers, holidays, or semester leaves of absence, travel would preclude college	Due to rigorous training and heavy meet schedule, swimming might interfere with college	X

Figure 8. A Cross-Impact Matrix Analysis [65]

The cross-impact matrix analysis method can also be applied to educational futures, as in the five-event interaction portrayed in Figure 9. Here, one postulates that the events numbered 1 through 5 will occur at some future time, say from 1976 to 2000. A computer is used to manipulate the data derived from a group of research subjects or participants in order to obtain information about probability of occurrence of each event, probable year of occurrence for an event, and, if an event were to occur, its probable effect on each of the other four events. Inputs would include trend data and estimates of both occurrence and impact. In Figure 9, the impact of event upon event is displayed in the five-by-five matrix at the far right of the table. These impact estimates were derived by having subjects judge the degree of impact according to a scale from -10 to +10, where -10 indicates that a particular event will have a very strong <u>negative</u> influence on another event in the corresponding column, a +10 means an event will have a very strong <u>positive</u> effect, and a zero indicates no probable impact. All degrees (i.e., numbers) of influence are potential choices--a continuum from -10 through zero to +10.

No.	Events: Effect of	Probability	Estimated Year of Occurrence	Impacts: Effect on Event No. 1	2	3	4	5
1	Laws requiring negotiation between school boards and teacher unions	.7	1978	--	10	4	3	1
2	All teachers in unions	.9	1976	8	--	6	6	4
3	Most students in unions	.3	2000	0	2	--	6	9
4	Voucher plan mandatory in half of states	.4	1980	6	6	0	--	10
5	20% in enrollment in "new schools"	.8	1980	-5	-7	6	10	--

Figure 9. Cross-Impact Matrix for Five Possible Educational Events.[88] From M. Folk, "Computers and Educational Futures Research." In M. Marien and W. L. Ziegler (Eds.), The potential of educational futures, 1972. Reprinted by permission from the National Society for The Study of Education, 5835 Kimbark Ave., Chicago, Il 60637. Originally published by Charles A. Jones Publishing Co.

A number of valid generalizations and inferences can be drawn from the results in Figure 9. For example, one could conclude that it is "most probable" (.9) that all public school teachers in the U.S. will be members of unions (NEA and affiliates or AFT and affiliates) by 1976, and that should this be the case, such an occurrence will have a strong positive impact (+8) on the passage of federal and/or state laws requiring (or allowing) collective negotiations between local school boards and teachers' unions. Since 1976 is now in the past, what has occurred is that over 60 percent of public school teachers are presently members of unions, but perhaps as high as 90 percent or more of public school teachers work in school districts with one or two strong, active teachers' unions. Further, Congress is now (1980) considering a bill to allow public employees, including teachers, to exercise all rights and responsibilities connected with the process of collective bargaining. Meanwhile, more and more state legislatures are passing laws to permit collective negotiations by public employees. Although the 1976 result forecast in the table has not yet occurred, the trend in that direction continues, as does the trend toward Event No. 1.

Scenarios. These are narrative descriptions of sequences of events, from past through present to future, from present to future, or totally future, leading to some anticipated future condition. A scenario describes an envisaged sequence and situation, as in this excerpt from Paul Ehrlich's article "Eco-Catastrophe!": [67]

> The end of the ocean came late in the summer of 1979, and it came even more rapidly than the biologists had expected. There had been signs for more than a decade, commencing with the discovery in 1968 that DDT slows down photosynthesis in marine plant life. It was announced in a short paper in the technical journal, Science, but to ecologists it smacked of doomsday. They knew that all life in the sea depends on photosynthesis, the chemical process by which green plants bind the sun's energy and make it available to living things. And they knew that DDT and similar chlorinated hydrocarbons had polluted the entire surface of the earth, including the sea.

In this example, the anticipated future situation is "the end of the ocean . . . in the summer of 1979," and the plausible sequence of events culminating in the ocean's death begins in 1968, the year in which the author wrote this scenario.

Herman Kahn and Anthony Wiener have noted six "advantages of the scenario as an aid to thinking":[68]

1. They serve to call attention, sometimes dramatically and persuasively, to the larger range of possibilities that must be considered in the analysis of the future. They are one of the most effective tools in lessening the "carry-over" thinking that is likely even when it is clear to all that 2000 cannot be the same as 1965 or even 1985. Scenarios are one way to force oneself and others to plunge into the unfamiliar and rapidly changing world of the present and the future: They dramatize and illustrate the possibilities they focus on in a very useful way. (They may do little or nothing for the possibilities they do not focus on.)

2. They force the analyst to deal with details and dynamics that he might easily avoid treating if he restricted himself to abstract considerations. Typically no particular set of the many possible sets of details and dynamics seems specially worth treating, so none are treated, even though a detailed investigation of even a few arbitrarily chosen cases can be most helpful.

3. They help to illuminate the interaction of psychological, social, economic, cultural, political, and military factors, including the influence of individual political personalities upon what otherwise might be abstract considerations, and they do so in a form that permits the comprehension of many such interacting elements at once.

4. They can illustrate forcefully, sometimes in oversimplified fashion, certain principles, issues or questions that might be ignored or lost if one insisted on taking examples only from the complex and controversial real world.

5. They may also be used to consider alternative possible outcomes of certain real past and present events, such as Suez, Lebanon, Laos, or Berlin.

6. They can be used as artificial "case histories" and "historical anecdotes" to make up to some degree for the paucity of actual examples.

Decision trees. A decision tree is a pictorial representation of "the potential results of alternative approaches to crucial decisions."[69] It is a futures methodology likening to a tree--with a trunk and main and subsidiary branches--a range and sequence of decision points, over time, and in relation to a goal or future situation. Decision trees are constructed in either the "growing tall" variety or the "cut down" version. The "growing tall" type appears to "grow" vertically from the bottom of a sheet of paper toward the top, with a thick trunk at the bottom and subsidiary branches extending toward the right edge, with the time continuum progressing horizontally from left (earliest dates) to right (furthest future dates). The "cut down" version lies on its side in a horizontal mode, with decision points extending from left (trunk and roots) to right (upper branches).

In Figure 10, the "growing tall" type of decision tree yields six discrete alternative futures (Futures A, B, C, D, E, and F) which might emerge from the various responses to decision point questions. Of these six futures, two (E and F) reflect an affirmative response to the question "Should we build a new high school?"; four (A, B, C, and D) are negative response options. In this example, the decision tree technique is used for deriving rather short-range alternative futures for an educational question. If our question were, "Should we develop and use biochemical products (drugs) to improve the learning achievement of public school students?", our decision tree would be more complicated and would involve a long-range time line. It is probable that such a tree would have to be mapped and contained in a computer.

Systems analysis. This is a futures research methodology particularly suited to making public policy decisions. A general definition for a system is "a defined collection of elements with their interconnections considered over a period of time."[70] Once the "collection of elements" and "their interconnections" have been defined, the system then can be analyzed. Analysis, in this context, "means that an entity can be resolved into its constituent elements and their relationships and then be examined again."[71] If, for example, we consider a public school third-grade class as a system (a social system), this implies that a collection of elements is present, that these elements are somehow interconnected, and that the system can be observed in

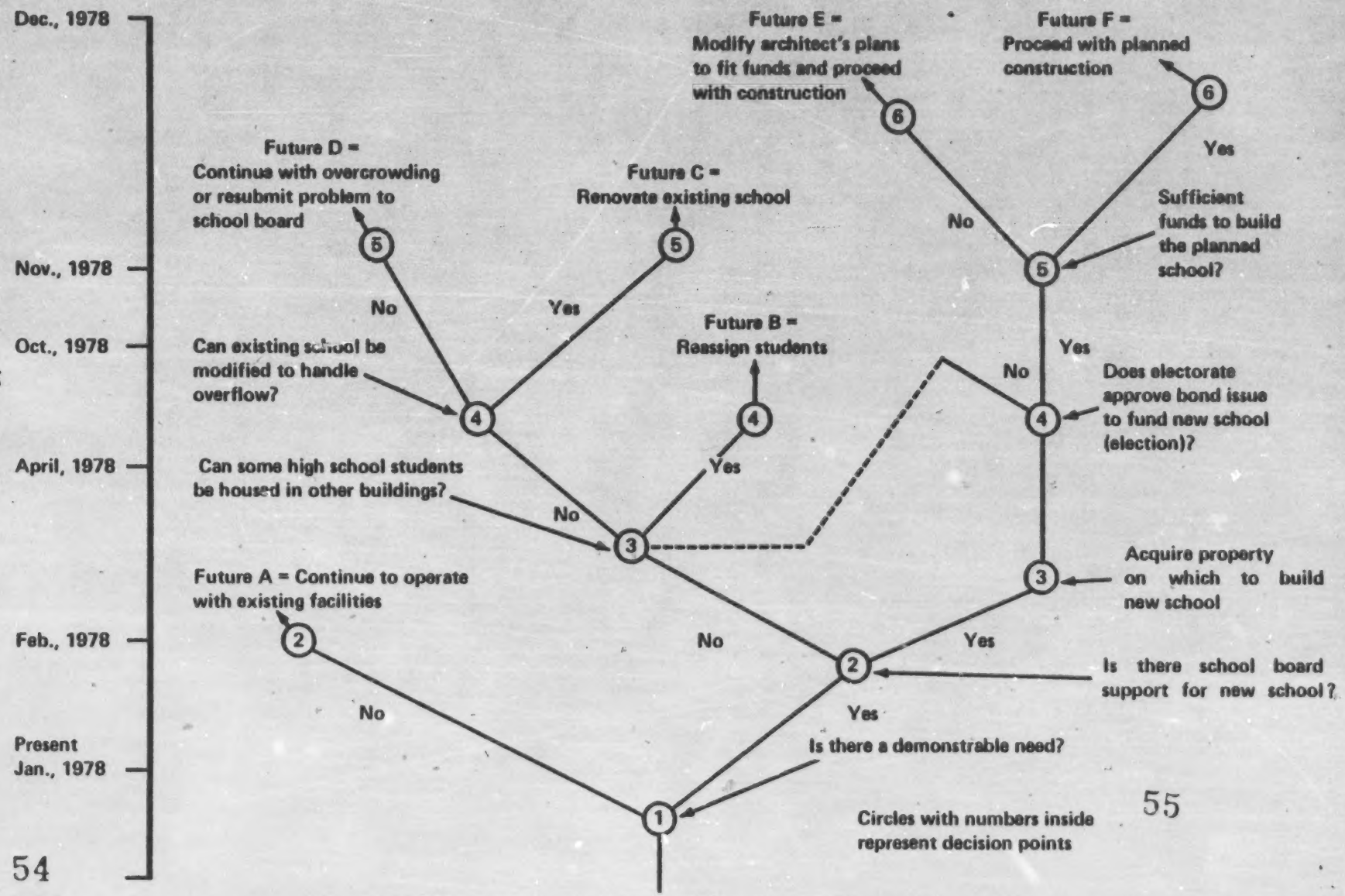
Dec., 1978
Nov., 1978
Oct., 1978
April, 1978
Feb., 1978
Present
Jan., 1978
Future E =
Modify architect's plans to fit funds and proceed with construction
Future F =
Proceed with planned construction
Future D =
Continue with overcrowding or resubmit problem to school board
Future C =
Renovate existing school
Future B =
Reassign students
Sufficient funds to build the planned school?
Yes
No
Can existing school be modified to handle overflow?
Does electorate approve bond issue to fund new school (election)?
Can some high school students be housed in other buildings?
Acquire property on which to build new school
Future A = Continue to operate with existing facilities
Is there school board support for new school?
Is there a demonstrable need?
Circles with numbers inside represent decision points

Figure 10. Decision Tree for the Question "Should we build a new high school?"

operation over time. These conditions do exist in our example of the third-grade class: The teacher, the students, the classroom and the materials and artifacts in the classroom are the elements. These elements are interconnected, though of course the connections are sociological and psychological rather than physical. Furthermore, the class-as-system is goal-directed or purposeful and is dynamic or changing over time, so that it can be analyzed in respect to changes toward or away from its goal(s) or purpose(s) and at various points in time. Each time this class-as-system is analyzed, not only are the changes with respect to the system's goal(s) revealed, but these data can also be used by any authorized and interested decision maker to intervene in, modify, or veer the system. In this example, such a decision maker might be within the system (the teacher or one or more students) or outside the system (the school principal or one or more parents).

Two of the most difficult aspects of systems analysis are defining the system and selecting and utilizing the appropriate techniques of analysis. Using the third-grade class example again, consider the difficulties of defining the system's goals, of setting the boundaries of the system, of describing sufficiently the human components of the system (the teacher and students), and of specifying the numerous interactions of the system [teacher-student(s) interactions, student(s)-student(s) interactions, and human-physical object interactions]. Also, consider the problems inherent in selecting and utilizing techniques for observing and recording changes in the system over time--of assessing what is happening in the classroom, what changes in interactions are occurring, what progress is being made toward component or system goals, what are the effects from internal or external interventions in the system.

Systems analysis has become a useful futures methodology in educational policy research. Among its uses as a source for educational decision makers are the following:

1. Analysis of basic issues involved in decisions relating to the funding and control of schools.

2. Descriptions of feasible alternative future educational systems and of the policy decisions which would tend to lead toward each.

3. Comparison of alternative means (e.g., instructional techniques) for aiming toward a set of goals (e.g., learning objectives).

4. Analysis of the dynamics of implementing a particular innovation, especially the anticipated interactions among advocates and opponents of the planned change.[72]

These eight futures research methodologies or forecasting skills can provide us with useful hunches, clues, or probabilities about the future, or, more accurately, about possible or probable alternative futures. But they cannot provide us with predictability or certainty concerning future events. The future is still an open system that remains amenable to human decisions and interventions.

There are a number of reasons why forecasts go wrong, and these should be kept in mind when studying futurists' forecasts.

--Unforeseeable historical accidents may occur.

--A forecast may itself spur decisions and interventions which invalidate the forecast.

--The use of invalid comparisons of analogies between past and future situations may invalidate the forecast.

--The futurist may misinterpret cause-and-effect relationships.

--A forecaster may allow his/her desires to cloud plausibility.

--The investigator may have used unreliable information or lacked pertinent data.

--A futurist may lack imagination and/or nerve.

--Incorrect calculations or varieties of overcompensation may occur.

--The forecaster may become preoccupied with a single pattern and/or omit pertinent developments.

The Future in the Curriculum

Our only choice with respect to the study of the future

> is between being completely surprised by the future and therefore wholly subject to the control of external forces or, alternatively, having some basis of knowledge about what is possible so that [we] can attempt to shape the future in accordance with [our] own desires and values.[73]

To study the future is a commitment to freedom, to the use of our margin of freedom in the face of all the forces that would predetermine our futures.

> Even more important than any specific bits of advance information, however, is the habit of anticipation. This conditioned ability to look ahead plays a key role in adaptation. Indeed, one of the hidden clues to successful coping may well lie in the individual's sense of the future.[74]

To study the future is a commitment to the worth and survival of the human species, to the link between the generations--young, old, and yet to be born.

For teachers and students, reasons for studying the future are at the same time alike and different. Both teachers and students are curious and full of wonder; they want to know and shape their personal and mutual futures; they are seekers, probing the multiple realities of their universe; and they value a just and joyous survival of their common species. Yet their justifications and motivations for studying the future differ.

Teachers pursue and benefit from futures study for several reasons. First, the topic is inherently relevant to their clients because children and youth will spend three-fourths to four-fifths of their lives in the future. Second, as Richard Bach observed in his recent best-seller, Illusions, "You teach best what you most need to learn."[75] Third, there is no dearth of fascinating and appealing topics and materials. Finally, futures study can fit into and draw on virtually every subject area in the curriculum, at any and all grade levels; it is a ubiquitous, multi-disciplinary subject.

Reasons for having students study the future are numerous and varied, but probably the most important justification is to help them improve their skills in making wise decisions, as individuals and as citizens. Other reasons are:[76]

- --to acclimate them to life in a changing world,
- --to provide them with frameworks for cooperation, reconciliation, and conflict management,
- --to foster creativity,
- --to stimulate learning as both a pleasant and useful process,
- --to help them develop appealing and worthwhile images of the future and personal philosophies of life,
- --to assist them to identify dangers and opportunities,
- --to enable them to see the present, and
- --to influence their degree of choice.

Curriculum Decisions

Once a social studies teacher is convinced and decides to have his/her students study the future, the question becomes where to include what in the curriculum. Ready responses are anywhere and everywhere, anything and everything, but these are not particularly useful to the teacher. Therefore, let us look at some more practical possibilities.

Classroom teachers would do well to begin planning by consulting with other teachers in their own school or district, as well as with local futurists or teachers of futures courses at nearby colleges or universities. Next, every teacher should heed these guidelines provided by Draper Kauffman:[77]

1. Begin with the student's own personal image of the future. . . .
2. Relate all subject matter to the future needs of the students.
3. Apportion space in the [futures] curriculum to different subjects. . . .
4. Explain the rationale for the curriculum choices to students, [parents, and others].
5. Allow the flexibility to accommodate differences in interests, ability, and future plans [of the student].
6. Present content in an interdisciplinary manner, emphasizing the underlying similarities of all living and social systems.
7. Organize the learning environment to stimulate creativity, self-motivated learning, and self-discovery.
8. Emphasize skills over knowledge, helping students learn 'sciencing' as well as science, forecasting as well as forecasts--in short, thinking as well as facts.

One source for deriving possible content for futures courses at any grade level is a list of futures categories and topics. The teacher might choose a number of categories (one or two per unit, or three or four per semester course, or six to eight per academic year course) and topics (maybe five or six per category) and use them to build a unit or course. A suggested list follows.

Futures Categories and Topics

I. Communication

1. Automated services (banking, supermarkets)
2. Computers (micro-, networks, intelligence)
3. Human/machine interactions
4. Picturephone and portable telephones
5. Television (3-dimensional, 100-channel, 2-way broadcasts, cable)
6. Space satellite stations (planet-wide networks)
7. Information processing
8. Extraterrestrial intelligence and communication

II. Energy and Other Natural Resources

1. Pollution
2. Fossil fuels (oil, coal, gas, geo-thermal)
3. Solar energy
4. Synthetic fuels
5. Fuel cells (lead-acid battery)
6. Nuclear energy (fission, breeder, fusion)
7. Land
8. Air
9. Water
10. Endangered species (flora and fauna)
11. Environmental protection policies and practices
12. Weather and climate modification

III. Family Life

1. Fertility control (contraceptives, abortion, family planning)
2. Women's liberation and occupations
3. Sex, courtship, and marriage patterns
4. Size of family and household
5. Genetic engineering (sex of fetus, cloning)

IV. Food and Agriculture

1. Arable land
2. Use of fertilizers
3. Crop yields
4. Droughts and famines
5. Ocean farming
6. Malnutrition and starvation
7. Diet (babies, calories, proteins)

V. Health

1. Organ transplants and prosthetic devices
2. Cancer and other terminal diseases
3. Pharmacology (drugs)

4. Infant mortality and problems of aging
5. Euthanasia (extraordinary life support, brain death)
6. National health systems (insurance, health care delivery)
7. Cryogenics
8. Mind altering (hallucinogens, "smart pills")
9. Epidemics (immunization and sanitation)
10. Drug addiction and alcoholism
11. Mental health

VI. Community and Habitat

1. Home robots
2. New towns and cities
3. Urbanization (megalopolises, inner city life)
4. House architecture and construction (building materials, designs, rent, financing ownership, condomania, second homes)
5. Intentional communities (rural and urban communes, voluntary simplicity)
6. Synthetic and natural environments (environmental engineering)
7. Demography (population mobility and stability, community size)
8. Open space (parks, recreation)
9. Unusual habitats (oceans, underground)

VII. Values, Attitudes and Life Styles

1. Country-cultural lifestyles
2. Social pathologies (alienation, helplessness, boredom, future shock)
3. "New age" consciousness
4. Mysticism
5. ESP and paranormal phenomena
6. Emergent and traditional values
7. Institutional work and life (bureaucracy, standardization, specialization, loss of freedom and efficacy)
8. Materialist vs. nonmaterialist values, philosophies, and lifestyles
9. Privacy and confidentiality
10. Information overload, confusion, incapacitation
11. Racism and sexism
12. Credentialism and meritocracy
13. New religions, changing older religions

VIII. Transportation

1. Nonfossil fuel automobile and airplane engines
2. Air traffic control and safety of planes
3. Mass transportation
4. Walking and bicycling
5. Oil tankers and merchant marine fleets
6. Urban traffic flows and patterns
7. Urban carbon dioxide/monoxide pollution
8. Speed and convenience
9. Space exploration and colonization

IX. Work and Leisure

1. Overconsumption and superabundance
2. New avocations and leisure pursuits
3. Unemployment and underemployment
4. Craft and quality (workmanship and productivity)
5. Poverty, guaranteed income, negative income tax
6. Collective bargaining issues (profit sharing, cost of living indexing, vacation time, shared corporate governance)
7. Consumer issues (dangerous products, quality, damaged goods, pricing practices)
8. Occupations (in production of goods, services, knowledge and technology; new kinds of jobs such as geriatric nurse or computer security guard or exobiologist)

X. Government and Economics

1. Inflation and unemployment
2. Recession and depression
3. Crime and violence
4. Police powers such as surveillance
5. Metropolitan and regional government
6. Local, state, and federal tax structures
7. Welfare and social services
8. Control of technology
9. Financing research and development
10. Authoritarianism
11. Citizen dissent and efficacy; participation
12. Types of decision-making formats and processes
13. Centralization of power
14. Planning and management of social change
15. Ideologies
16. New scarcities and limits to growth (resource economics, scaling down, steady-state economy)
17. Profit, pricing, productivity, capital investment, interest rates, money supply

XI. International Affairs

1. The rich and poor nations (redistribution of wealth, commodity pricing, balance of payments, trade agreements, power blocs)
2. Regulating the transnational corporations (control of trade, taxation)
3. "Ugly American" stereotype, problems of cross-cultural living, multilingualism, world religions
4. United Nations and prospects for world federalism and world law
5. Regulating use of oceans, air, space
6. Terror and nuclear blackmail, "limited" war, thermonuclear war, civil war
7. International monetary system, world bank, development loans
8. Urbanization (urban growth and squalor)

9. Poverty, famine, drought, and starvation; relief for natural disasters
10. Production and sale of military weapons, arms limitation treaties, storage of long-lived nuclear energy waste products, size of military establishments
11. Rising expectations and demonstration effects
12. International elites (powerful, wealthy, famous persons)

XII. Education

1. New careers (home educator, industrial educator, gerontologist)
2. Affective and experiential education
3. Enrollments (private and public schools, K-12 and college-university)
4. Education of the handicapped
5. Problems of schools as institutions (depersonalization, bureaucracy, alienation)
6. Deschooling schemes and voucher plans
7. Teacher unionism
8. Legal rights of students and teachers
9. Pre-primary education (ages 1 to 5)
10. Instructional technologies ("hardware" and "software")
11. Human relations and interpersonal skill training
12. Financing schools, colleges and universities, economics of equal educational opportunity
13. School-as-community, social system, school and society
14. Problems of "under-" and "over-education"
15. Stages of lifelong education
16. Centralization of authority and decentralization and community control
17. Global and future studies

The preceding list of categories and topics is more than merely illustrative, yet less than exhaustive.

A second list might also prove useful. This one suggests categories and types of <u>skills</u> that could be emphasized in a study of the future.

Learning Objectives for a Future-Oriented Curriculum[78*]

Access to Information

Reading
Listening and seeing
Direct experiment
Libraries and reference books
Computerized data retrieval
Data from newspapers, businesses government agencies, etc.
Asking experts
Judging reliability
Managing information overload

Thinking Clearly

Semantics
Propaganda and common fallacies
Values clarification
Deductive logic
Mathematics
Analytical problem solving
Scientific method
Probability and statistics
Computer programming
General systems
Creative problem solving
Forecasting and prediction

Communicating Effectively

Speaking informally
Public speaking
Voice and body language
Cultural barriers to communication
Formal and informal writing
Grammar, syntax, and style
Drawing, sketching, still photography, film making, etc.
Graphic design and layout
Outlines, flow charts, charts, tables, and graphs
Organization and editing
Handwriting, typing, dictating

Understanding Man's Environment

Astronomy, physics, and chemistry
Geology and physical geography
Biology, ecology, and ethology
Genetics, evolution, and population dynamics
Fundamentals of modern technology
Applied mechanics, optics, and electronics

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*From D. L. Kauffman, Jr., Teaching the future, © 1976. Reprinted by permission from ETC Publications, 700 East Vereda del Sur, Palm Springs, CA 92262

Understanding Man and Society

Human evolution
Human physiology
Linguistics
Cultural anthropology (including history and the humanities)
Psychology and social psychology
Racism, ethnicity, and xenophobia
Government and law (especially American constitutional law)
Economics and economic philosophy
Changing occupational patterns
Education and employment
Issues in human survival
Prospects for mankind

Personal Competence

Physical grace and coordination
Survival training and self-defense
Safety, hygiene, nutrition, and sex education
Consumer education and personal finance
Creative and performing arts
Basic inter-personal skills
Small group dynamics
Management and administration
Effective citizen participation
Knowledge of best personal learning styles and strategies
Mnemonics and other learning aids
Bio-feedback, meditation, mood control
Self-knowledge and self-motivation

Next is a list of values, attitudes, behaviors, and skills which a teacher might use as focuses for a futures curriculum.

Educational Goals for the Future[79*]

1. Values and Attitudes

a. Less fear of the unknown and a greater trust and respect for diversity of people and life styles will predominate.

b. A willingness to explore new patterns of interaction and flexibility rather than rigidity will characterize human behavior.

c. A high value on creativity as an essentiality for individual and collective survival and self-actualization will be realized.

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*From C. W. Case and P.A. Olson (Eds.), The future: Create or inherit, 1974. Reprinted by permission from the Nebraska Curriculum Development Center, University of Nebraska, Lincoln, NB.

d. An emphasis on the quality of life rather than the quantity of material possession will predominate.

e. A renewed social commitment to the value of human life will be operationalized.

f. A renewed respect for nature as opposed to current beliefs that nature is here only for man's use, and a biosphere perspective and a respect for mutual interaccommodativeness will prevail.

g. Global loyalty rather than competitive nationalism will guide the interaction of populations in different geographic areas.

h. A willingness to share equally the world's resources will be achieved.

i. A reintegration of man's intellect, feelings, and body and a greater trust in sensory and emotional experience will be manifested in societal attitudes.

j. A greater emphasis on cooperation rather than competition will characterize the relations between individuals and between groups.

k. A belief in the unlimited potentiality of man individually and collectively will be evidenced in the support individuals receive from their institutions.

l. A commitment to achieve and maintain a balance between individual actions and the common good will characterize individual and government decision-making.

m. A belief in man's ability to collaboratively create and maintain a humanistic, dynamic, equilibrium society will serve as a mission shared by all.

n. Authority will derive from competence and knowledge rather than from role and power.

o. Equal respect for manual, intellectual, and aesthetic endeavors will be manifested by equal respect and equality in the distribution of resources.

p. Individuals will delight in the multiple choices available at any decision point.

2. Behaviors

a. Individuals will exhibit a high tolerance for ambiguity and be relaxed when confronted with uncertainty, and will have the emotional ability to struggle with problems for which there are not easy and specific answers.

b. When in problem-solving and planning situations, people will initiate an automatic searching for all possible alternatives and options, anticipate contingencies, and predict long-range as well as short-range effects.

c. Persons will utilize a variety of holistic analytical techniques for problem solving. Future man can no longer rely on precedent, linear forecasting, analogy, and extrapolation--all such methods assume a static world rather than a dynamic world.

d. Conceptualization will be characterized by an emphasis upon the interrelatedness of global parts--that is, the comprehension of complex wholes and the understanding of specific parts within the context of the complex whole.

e. Cognitive and affective processes that extend man's ability to conceptualize globally and in extensive time frames must be developed.

f. Groups will approach all decision-making activity committed to a collaborative process of consensual validation that seeks alternatives to win-lose models.

g. Individuals and groups will engage in a continuing process of self-renewal and will initiate actions that insure self-renewal for all.

h. It will be expected that processes be initiated and sustained for value clarification for individuals and groups.

i. Most actions will be characterized by altruistic behavior.

j. Most interaction will be characterized by cooperative rather than competitive behavior.

k. Interpersonal communications and interaction will be formed and severed rapidly.

l. Self- and group discipline will be initiated to control the use of resources.

m. Sharing will be commonplace.

n. Individuals will be self-reliant and group-reliant, and be able to shift from one to another as necessary.

o. Persons will manage self-change and be able to participate in the management of group change.

p. Collaboration with others will be an expected behavior.

q. Authentic behavior that integrates intellect, feelings, and body will be exhibited at all times.

r. Persons will individually and collectively act for what is believed to be desirable.

s. The ability to communicate with a variety of individuals will be essential.

t. The initiation of acts that will further one's self-actualization will be a continuous process.

u. Risk-taking behavior will not be avoided.

3. Skills

a. Information processing skills will be essential--especially the ability to store, retrieve, sort, and relate pertinent information to specific needs.

b. General and social systems analysis techniques will be required to better understand the complexity of various structures and to better perceive the reciprocity, the connections, and the interdependencies between and within systems.

c. Individual and group planning techniques will be needed so that individuals and groups can better make proactive decisions.

d. Value clarification techniques will need to be used extensively to clarify purposes and implicit values among alternative courses of action.

e. Individuals will need independent learning and unlearning techniques for their continuous growth and development.

f. Individual and group reinforcement techniques will be utilized to provide interpersonal support for individual and group growth and development.

g. Systems dynamics analysis and planning techniques will be widely used to understand the long-range consequences of current decisions.

h. A variety of communications techniques will be needed to enhance understanding between diverse individuals and groups.

i. Extensive linguistic ability in a variety of languages will be required to facilitate the development of global community and a respect for cultural diversity.

j. Most persons will need skill in a variety of manual skills to aid in the preservation and recycling of finite sources, and to facilitate comprehensive personal development.

k. Forecasting skills will be needed to anticipate short-range and long-range consequences of proposed actions.

l. Counseling and group dynamics techniques are needed to aid others in their process of development and to increase effective communications in groups.

m. Each person will be able to use a variety of conceptual frameworks.

n. Aesthetic skills for personal expression and the development of new images will be essential for persons to fully self-actualize, and for society to rise to new levels of synergy.

o. Skill in conflict management will be needed to aid communications, planning, and decision-making activities among diverse individuals and groups.

p. People will need techniques and processes to free sensory and emotional experience for full personal development.

Rojas and Wentworth observe that "it is fairly typical to divide [futures] courses into two sections: background themes and alternative futures. The most common background topics include:"[80]

--population

--ecology and environment

--education

--international relations

--historic conceptions of the future

--urbanization

--privacy

--automation, computers, cybernetics

--systems thinking

--science fantasies and utopias
--creativity
--concepts of time

They continue with a second list of common alternative futures topics for units of study:[81]

--forecasting methods
--biomedical developments
--global changes
--new values
--impact of technology on society
--rate of change
--economic change
--the future of sex and marriage
--technological change
--planning
--social control
--postindustrial society
--transportation and communication
--theories of futuristics
--life and influences of individual futurists
--prospects for war and peace

Finally, an excellent set of "Guidelines for the Determination of Objectives for Futures Education Programs" appears as an appendix in a current National Council for the Social Studies curriculum bulletin.[82]

Futures in the Elementary School

In the elementary school curriculum, one unit per grade level (grades 1 to 6) is probably a feasible optimum. Such units should probably be integrated into the entire curriculum, cutting across such subjects as social studies, science, and language arts. Each unit should provide for the simultaneous pursuit of multiple objectives, and could be developed by a "mix and match" usage of the preceding categories/topics lists.

Unfortunately, little has been written about future studies in the elementary curriculum. One might expect that futures units at these grade

levels could be based on one or more of the categories in the lists on pages 51 through 56. Teachers at the primary level (K-3), however, might object to these lists, feeling that they contain topics too sophisticated for or too remote from the experiences of their students. For these teachers, the following topics might be more appropriate sources of futures units and activities:

1. Concepts of time--the continuum from past to present to future--as manifest in a child's lifetime and in the lifetimes of the child's family: mother and father, grandparents and great grandparents, siblings and peers, future friends, husband or wife, and expected offspring (perhaps using life cycles and birth-life-death timelines);

2. Futures we take for granted: the seasons, the motions of our solar system, almanac forecasts of climate, daily routines (breakfast, lunch, dinner, the school schedule, sleep, favorite television shows);

3. Discontinuities or changes that affect us: death in the family; friends who move away; siblings who go away to camp, college, work; wars and depressions; personal accidents (broken arm) and diseases (chicken pox);

4. Fascination with and anticipation of the <u>new</u>: presents at birthdays and holidays, new family acquisitions such as car and television set, a new baby in the family, new toys (perhaps having students design new toys or soft drinks);

5. Coming events: in family, school, and community (perhaps focusing on factors that could cause postponements, cancellations, or delays);

6. Fascinating and curious current events: return of Soviet cosmonauts Lyakhov and Ryumin from record 175 days of living in space (discussing their daily routines, and unusual or surprising events); NASA's Pioneer 11 flying "close" by the planet Saturn (photographs of planet and its moons; is there life on the moon Titan?);

7. Home/family energy use and conservation (amounts and types of energy used; conservation measures like insulation, storm windows, weather-stripping);

8. Exponential growth and its effects (stories of doubling times--lily pads in a pond; 64-square chess board).

Of course, any one of the above suggested ideas is also appropriate for later elementary grades, middle schools, or junior and senior high schools.

Probably the greatest asset to introducing future study into the elementary school is the multidisciplinary nature of the teaching; most elementary teachers teach almost all subjects in the curriculum. This is an advantage because the study of the future is also, by its very nature, multidisciplinary.

Futures in the Secondary School

Secondary school teachers have many futures curriculum options. Courses or units may be included in the offerings of English, science, and social studies departments. A course can be jointly offered (and team taught) in two or three subject areas: English and social studies, or English and science, or science and social studies, or English, social studies, and science. For example, a team-taught multidisciplinary futures course extending over an academic year might include the following four-week units:

1. Introduction to the Future (key concepts, futurists, and futures methodologies)

2. Novel: Walter M. Miller, A Canticle for Leibowitz (containing themes of church vs. state, authority vs. freedom, technological trends)

3. Limits to Growth (implications of slow or no growth for employment, availability and use of resources, standard of living, GNP, etc.)

4. Poverty and Starvation (in U.S. and Third World nations, absolute and relative poverty and malnutrition, solutions)

5. New Technologies: Benign or Malignant? (in computers, health, genetics, energy sources, supply and use)

6. Literary Utopias (one or two of these: B.F. Skinner, Walden II; Edward Bellamy, Looking Backward (2000-1887); Aldous Huxley, Brave New World; George Orwell, 1984)

7. New Age Consciousness (new lifestyles and careers, states of altered consciousness, ESP, split-brain studies, etc.)

8. Science Fiction (one or two of these: H.G. Wells, The Time Machine; Ray Bradbury, Fahrenheit 451; Arthur C. Clarke, Childhood's End; Frank

Herbert, Dune; Robert Heinlein, Stranger in a Strange Land; Kurt Vonnegut, Jr., Player Piano)

9. A Future for You (an individual student's future "history" from now to age 100, a chronological written paper)

Or as another example, here is a junior high school course taught in Quincy, Massachusetts, and described in Toffler's Learning for Tomorrow:[83*]

Week I. Why are we going to look into the future?
Who else has looked into the future?

A. The prophets in the Bible
B. Utopians and anti-utopians
C. Science-fiction writers
D. Clairvoyants
E. Philosophers
F. Weather forecasters
G. Futurists

Week II. What is the path of man's evolution?
What is man's future biology?

A. Evolution
B. Self-modified man
C. Genetic engineering
D. Population control
E. Medicine in the future
F. Future implications for drugs, alcohol, tobacco

Week III. How will man's primary and secondary needs be met?

A. Shelter
B. The environment
C. Transportation
D. Communication
E. Education

Week IV. Options for man: Where else could man satisfy his needs if present trends continue?

A. Outer space
B. Under the sea

Week V. Extension of man. How will man relate to new technologies?

A. Computers
B. Automation

*From A. Toffler, Learning for tomorrow, 1974. Reprinted by permission from Vintage Books, Random House, Inc., 201 East 50th St., New York, NY 10022.

Week VI. Future social relationships--microcosmic and macrocosmic.

A. Influence of the young on family structures
B. Changing roles--Women ask "Why?"
C. Community life
D. National and international relationships

Week VII. Things to Come--science-fiction literature

This final part of the unit involved both reading and writing of science fiction. Field trips to science-fiction movies would fit in nicely.

Week VIII. Future Fair

A recent World Future Society publication annotates 36 courses taught in secondary schools around the country. Of these, the following list of course titles and emphases is a representative sample:[84*]

Course Title	Emphasis
1. People and Technology: Present into Future (a course developed and published by Education Development Center, Cambridge, MA)	--human-environment interactions in different times and places --technology: past, present, future
2. Metropolitan Living	--urban life: past, present, future --alternative city systems --environment, energy, lifestyles

*From World Future Society, The future: A guide to information sources, 1977. Reprinted by permission.

Course	Emphasis
3. The Future	--nature of change --population dynamics --forecasting and scenarios --alternative lifestyles --alternatives to pollution and technology --future city and social institutions
4. Computers, Society, and the Future	--computer trends --fundamentals of FORTRAN --how computers work --machines in work and play --technology and economics --machines in communication, transportation, education --evolution of machines
5. Sociology III	--social change (e.g., the bicycle and the automobile) --mind and nature of humans --inventing the future via scenarios --comparisons of agrarian, modern, and postindustrial societies
6. Futuristics	--thematic approach: unit topics varying from semester to semester --architecture, science and values, futures forecasting methods, science fiction as prophecy, living with technology

Course	Emphasis
7. Futures Studies	--biomedical revolution --alternative futures concepts --nature of change --education, food, energy, communications, transportation, family, marriage, sex, values, work, leisure --futures forecasting methods
8. Toward the Year 2000	--biological revolution --behavior modification --new religious expressions --computer and society --science fiction --goal setting --future of education
9. The Future of Man	--focus on values clarification --topics: medicine, war, population, housing, etc.
10. What About Tomorrow? (Based on Mary K. Howard and Betty B. Franks, Looking Forward: A Mini-Course in Futures Studies, McGraw-Hill)	--futuristics --biological revolution --food, cities, population work, lifestyles

Three Selected Bibliographies

The final section of this monograph on future studies is comprised of three selected bibliographies, the first of which is annotated. These are by no means comprehensive lists of citations, but they do provide teachers and other curriculum developers with rather carefully screened and hopefully useful bibliographies.

Because of the breadth and scope of the futures field (even in its infancy), someone's favorite work has undoubtedly been omitted. The author apologizes in advance for such oversights--they are inevitable.

The titles and major sub-headings of each of the bibliographies are outlined below:

I. A Brief Basic Bibliography on the Future (readings for the teacher and curriculum developer)

II. A Selected Bibliography on Futures Topics
- A. General Background on Social Futures
- B. Communication and Transportation
- C. Community and Habitat
- D. Education
- E. Energy and Other Natural Resources
- F. Family Life
- G. Food and Agriculture
- H. Government and Economics
- I. Health
- J. International Affairs
- K. Values, Attitudes, and Lifestyles
- L. Work and Leisure

III. Future Studies Curriculum Bibliography
- A. Methods Books
- B. Course and Unit Textbooks
- C. Science Fiction
- D. Media
- E. Selections from ERIC

I. A Brief Basic Bibliography on the Future

Bell, D. The coming of post-industrial society: A venture in social forecasting. New York: Basic Books, 1973.

Daniel Bell is one of the early futurists who began his involvement in the mid-1960s, a convert from sociology. He is probably best known for his popularization of the sequence of civilization stages from pre-industrial to industrial to postindustrial.

Brown, L. R. The twenty-ninth day. New York: W. W. Norton, 1978.

This recent volume by Brown may be the best overview of the multifold global dilemmas, written in a flowing style and using language all can comprehend. It could even be used as a textbook in a high school futures course.

Bundy, R. (Ed.). Images of the future: The 21st century and beyond. Buffalo, NY: Prometheus, 1976.

Editor Bundy has compiled this balanced collection of articles from The Humanist, the journal of the American Humanist Association. Its unique value is in its focus on images, on varied ways of conceiving social futures.

Clarke, A. C. Profiles of the future. New York: Bantam Books, 1958.

Clarke is known as the author of 2001: A Space Odyssey and other science fiction works such as Childhood's End. In this volume he brings his keen mind and honed writing style to an analysis of futurology and of the points of view of futurists, as of the 1950s. Full of historical and unusual anecdotes.

Cornish, E., et al. The study of the future. Washington, DC : World Future Society, 1977.

The senior author is known world-wide as the founder (with Sally Cornish) of the World Future Society (50,000 members). In this excellent introduction to futurology, the authors present the parameters of the field, the views of leading contemporary futurists, some global issues, and some of the research methods used by futurists. This is frequently used as a textbook in college undergraduate futures courses and occasionally in high school futures courses.

de Jouvenel, B. The art of conjecture. New York: Basic Books, Inc., 1967.

In this philosophical and linguistic analysis of the art of forecasting, already a classic, the Frenchman de Jouvenel presents a tour de force of the futures landscape.

Drucker, P. The age of discontinuity. New York: Harper & Row, 1968.

For years this observer of the American social scene has displayed keen insights. As a generalist social scientist, Drucker in this work describes the traumas of social change, especially during today's transitional social era.

Ellul, J. The technological society. New York: Knopf, 1964.

Another classic is this sociological and philosophical treatment of technology, specifically of the ubiquitous concept of technique. The author not only sees Western cultures as slaves to the machine, but, in a more devastating way, technology as larger than the machine products of today. For Ellul, technology is a broad concept that encompasses all the ways and means of doing things in a technological society--technique and techniques.

Fabun, D. The dynamics of change. Englewood Cliffs, NJ: Prentice-Hall, 1967.

This beautifully conceived volume is a collage of imaginative writing, carefully selected color photographs, clever charts, and appropriate quotations from Western literature (as margin amplifications of the essays). The six chapter titles are: The Dynamics of Change, The Promised Land (population and environment), Telemobility, Automation, The Leisure Masses, and Foreseeing the Unforeseeable.

Fabun, D. The dimensions of change. Beverly Hills, CA: Glenco Press, 1971.

A companion to The Dynamics of Change, this generously illustrated volume deals with the topics of ecology, shelter, energy, food, mobility, and telecommunications. At the least, the two Fabun volumes should be school library acquisitions.

Falk, R. A. A study of future worlds. New York: Free Press, 1975.

Political scientist Falk is concerned about the types of international political organizations that will be needed to cope effectively with regional and global social problems. He argues that all these problems are simultaneously national and supra-national in scope and impact. He makes proposals to attain a set of goals by the year 2000.

Ferkiss, V. C. Futurology: Promise, performance, prospects. The Washington Papers, 50, Beverly Hills, CA: Sage Publications, 1977.

This slender volume gives a succinct overview of the field and includes an excellent brief bibliography. It is written for the novice, who could well be a student in a secondary school futures course.

Fitch, R. M., & Svengalis, C. M. Futures unlimited. Washington, DC : National Council for the Social Studies (Bulletin 59), 1979.

For the teacher who is planning a new course or unit at the elementary or secondary level, this booklet is an indispensable tool. Excellent bibliographies (one annotated) are included.

Fuller, R. B. Operating manual for Spaceship Earth. New York: Pocket Books, 1969.

This delightful short history of Western civilization is by one of the unique minds of this century, a man who models in his life that characteristic which the future will demand--comprehensive thinking. The main point Fuller makes is that Earth, unlike modern cars, came without an operating manual, and our ignorance of how Earth, as a system, works cannot be tolerated much longer.

Hardin, G. Exploring new ethics for survival, the voyage of the Spaceship Beagle. Baltimore: Penguin, 1972.

Garrett Hardin is probably best known for his concept of "the tragedy of the commons," that self-interest impels a person to exhaust the "commons" before his or her own personal property. In this work Hardin tells a fictional tale of a journey of the spaceship Beagle (named after Charles Darwin's ship), and intersperses ecological analyses with episodes of the voyage. The adventure and the essays make for good reading and a powerful message.

Harman, W. W. An incomplete guide to the future. San Francisco: San Francisco Book Co., 1976. (Now available from W. W. Norton.)

Harman--engineer, economist, psychologist--is an exemplar of a futures transformationalist. In this volume, he presents a critique of the "industrial paradigm" and its contemporary dilemmas (e.g., growth vs. depletion of resources), and then points to the seeds of "changing images of man": new transcendentalisms, new knowledge in the fields of subjective experience, consciousness, and paranormal phenomena; and new strategies (e.g., voluntary simplicity) for coping in the emerging "transindustrial society."

Heilbroner, R. L. An inquiry into the human prospect. New York: W. W. Norton, 1974.

The economist and philosopher Heilbroner presents in this slight book a dismal view of the human prospect. He sees decline in both capitalist and socialist economies, with little hope for any short-term or even long-term recovery, short of drastic social revolutions accompanied by much trauma and tragedy.

Kahn, H., & Wiener, A. J. The year 2000: A framework for speculation on the next thirty-three years. New York: Macmillan Company, 1967.

A classic in futures literature, The Year 2000 represents an example of the extrapolationist approach to the study of the future. Kahn is the founder of the famous Hudson Institute, one of the most prestigious futures think-tanks in the U.S. In this work, the authors present an optimistic picture of the economic future in the industrialized nations (i.e., the U.S., Japan and Western Europe), a future of unprecedented growth in GNP.

Kahn, H., Brown, W., & Martel, L. The next 2000 years: A scenario for America and the world. New York: William Morrow and Company, 1976.

This is a more recent projection by the Hudson Institute, yet still quite optimistic, if somewhat more guarded than the 1967 report.

Leonard, G. B. The transformation: A guide to the inevitable changes in humankind. New York: Delacorte, 1972.

Leonard is a spokesperson for "new age consciousness" and the human potential movement. Here he presents what might be called the inner game of transformation--the next vital changes in human evolution. An excellent writer, Leonard is a master of vivid metaphors and vibrant descriptions of nature. This paperback would be a good textbook for high school students, giving them a romantic transformationalist perspective.

McHale, J. The future of the future. New York: George Barziller, 1969.

John McHale, recently deceased, was a leader in the movement to popularize futurology and future studies. In this book he describes our social predicaments from a planetary perspective, arguing that the future we get will be the one we plan and work for and that all problems are ultimately global in nature. He believes that a planetary culture is now beginning to emerge.

Mumford, L. The transformations of man. New York: Harper and Brothers, 1956.

Lewis Mumford is one of those rare Renaissance persons whose mind ranges broadly over many landscapes. One is tempted to say that anything Mumford has written is worth reading. Here he traces the social evolution of the human species through a number of historical transformations: from animal to human, from nomad to civilized, from subsistence to transcendence, from "old world" to "new world," to "post-historic man."

Ophuls, W. Ecology and the politics of scarcity. San Francisco: W.H. Freeman, 1977.

An excellent and concise treatment of the problems of scarcity and limits. Also an excellent treatment of the solution--a steady-state economy. The end-of-chapter "Bibliographic Notes" are superb guides to the literature, as is the "List of Sources" by chapters at the end of the book.

Polak, F. The images of the future (E. Boulding, trans.). San Francisco: Jossey-Bass, 1973.

Another classic in futures literature. Polak, a Dutch philosopher and sociologist (Elise Boulding did the translation to English, in abridged form), makes a case for the significance of personal and social images of the future. He deals with historical images of the future in Western civilization, the dynamics of images of the future, and "the broken future of Western culture." This work is still relevant, though written in the early 1950s.

Roszak, T. Person/planet. New York: Doubleday, 1978.

For over a decade, Theodore Roszak has been the popularizer of the counter-culture in American society in such works as The Making of a Counter-culture, Where the Wasteland Ends, and Unfinished Animal. In this, his most recent work, he tries to tie the seeds of a consciousness revolution and the rise of the Aquarian age to the prospects for planetary stewardship. He also attempts to counter the critics of the "new age" who charge that the Aquarians are no more than upper-middle-class hedonists who practice rampant individualism at the expense of social/global awareness.

Salk, J. The survival of the wisest. New York: Harper and Row, 1973.

Nobel laureate (for polio vaccine) Salk shifts his focus from medical science to the threats to survival of our species: over-population, environmental degradation, etc. He presents the "S" or sigmoid curve as the metaphor of wisdom (slowed growth and then stability) and suggests that we are at the point of inflection (the crucial decision point) on that curve, a point between the lower and upper arcs of the "S." We can continue to ignore limits until catastrophe strikes, or we can begin to slow all forms of growth, moving toward a natural or ecological equilibrium.

Slater, P. Earthwalk. Garden City, NY: Anchor/Doubleday, 1974.

In a similar vein to Roszak's Person/Planet, this book is a plea for heightened awareness of global ecology and for a new form of individualism, one that makes social concern an aspect of enlightened self-interest. It is a well-written and impressionistic work that exemplifies much of the transformationalist futures literature.

Spekke, A. A. (Ed.). The next 25 years: Crisis and opportunity. Washington, DC : The World Future Society, 1975.

This volume, published by the World Future Society and typical of the high quality of their publications, contains articles by the top names in current futurology: Roy Amara, Willis Harman, Herman Kahn--to name only a few. Articles are organized under ten chapter titles.

Stavrianos, L. S. The promise of the coming dark age. San Francisco: W. H. Freeman, 1976.

The paradoxical title is an accurate representation of Stavrianos' point of view. He sees hectic and agonizing times ahead as we go through the transition to a future Renaissance. Major changes coming are shifts from "aristo-technology to demo-technology," from "boss control to worker control," from "representative democracy to participatory democracy," and from "self-subordination to self-actualization." The author is a historian who seeks clues to the future in historical analogies.

Theobald, R. An alternative future for America's third century. Chicago: Swallow Press, 1976.

Written for lay persons, this book attempts a scenario to counter the dystopias of such writers as Huxley, Orwell, Vonnegut, and the Club of Rome. In Part I he argues that there is both reason for hope as well as reason for despair. In Part II he examines "problems and possibilities" in the fields of communications, environment, politics, economics, and others. Part III is a call for individual and group action including a few strategies and case studies. Part IV describes some questions to spark interest in studying the future.

Thompson, W. I. Darkness and scattered light. New York: Anchor/Doubleday, 1978.

A former history professor who is now a member and leader of the intentional community on Long Island, Thompson has been writing about the impending transformation of Western culture and consciousness since his 1971 work, At the Edge of History. In Darkness and Scattered Light he points to the decadence of industrial and technological societies (Darkness) but also sees a significant minority trying new modes of survival (e.g., voluntary simplicity and appropriate or intermediate technology) that will be necessary to transform culture (Scattered Light).

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We can thank Toffler for popularizing futurology with his best-seller, Future Shock. This classic in the field is somewhat shallow and simplistic, yet its mass appeal in hardbound and paperback editions kindled the present interest in and support of futures research and future studies courses.

Toffler, A. (Ed.). The futurists. New York: Random House, 1972.

In this volume, Toffler as editor exposes the reader to some of the key writers in the field as well as to the research methodologies futurists use. First, he introduces the "social critics," such as Paul Ehrlich, John McHale, and Robert Jungk. Next he introduces the scientists--Arthur C. Clarke, Olaf Helmer, Kahn and Wiener, and Theodore Gordon. Finally the "philosophers and planners" appear--Kenneth Boulding, Daniel Bell, Bertrand de Jouvenel, and R. Buckminster Fuller.

Toffler, A. The eco-spasm report. New York: Bantam Books, 1975.

Toffler analyzes the planetary problems here, the "crisis of crises" centering on economics. "The eco-spasm or spasmodic economy describes an economy careening on the brink of disaster, awaiting only the random convergence of certain critical events that have not occurred simultaneously--so far." He expects the disaster to occur, but also suggests how to cope with crisis and how to prepare for the transition to new ways of life.

Wagar, W. W. Building the city of man: Outlines of a world civilization. New York: Grossman Publishers, 1971.

This volume is a favorite in college futures courses, probably due to its doomsday "realism" and its faith in the younger generations. Wagar is a brilliant thinker on a world and cosmic scale. As a historian, his writing style and historical perspectives combine for exciting and stimulating reading.

World Future Society. The future: A guide to information sources. Washington, DC : World Future Society, 1977.

This book is a tool of invaluable utility to anyone working in the futures field. First, there is a list of "organizations" which includes vital information on each organization. Next, a list of "individuals" including a brief vita for each person listed. Then, a list of well-annotated sponsored "research projects" followed by "books and reports" (about half of which are annotated) divided into periodicals, educational courses and programs, films, audiotapes, games and simulations, "other media," and finally a glossary of about 70 futures terms.

II. A Selected Bibliography on Futures Topics

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